Precontact Utilization Of Sandhill Environments During The Pelican Lake And Besant Phases

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ABSTRACT

Construction of a natural gas pipeline through central Saskatchewan resulted in three years of investigation at two archaeological sites within the Douglas Park Sandhills near Elbow, Saskatchewan. Excavation, testing, and monitoring resulted in the recovery of an array of cultural materials from sites EgNn 9 and EgNo 23. Typical precontact period campsite activities and the communal hunting of bison are indicated by the cultural materials recovered. Diagnostic projectile points collected from sites EgNn 9 and EgNo 23 date occupation of the region to the Middle and Late Precontact Periods. Controlled excavation of the sites resulted in the identification of a series of intact buried occupations dating to the Pelican Lake and Besant phases. Sites EgNn 9 and EgNo 23 provide valuable insight into precontact utilization of sandhill environments within the greater grasslands ecosystem of the Great Plains. This thesis includes an overview of precontact utilization of sandhill environments across the Great Plains and a view into the subsistence and settlement choices made by precontact populations within the region. The archaeological record of the Great Plains indicates that precontact populations developed a stable, broad spectrum hunter-gatherer adaptation to the region following glacial retreat and the opening of the vast grasslands. Integration of the resources available from the 'ecological islands' created by sandhill ecosystems appears to have begun in the Early Precontact Period and continued through to the Historic Period. The focus of this thesis is the Pelican Lake and Besant phases which are represented at sites EgNn 9 and EgNo 23, and have been identified at the full range of archaeological sites identified within the Great Plains region. An overview of the Pelican Lake and Besant phases across the northern Great Plains is also included in this thesis.

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CHAPTER 1
INTRODUCTION

1.1 Introduction

Multicomponent archaeological sites EgNn 9 and EgNo 23 are located at the northern edge of the Douglas Park Sandhills in south central Saskatchewan, approximately 20 kilometers southeast of the town of Elbow (Figure 1.1). Detailed archaeological investigation of these sites was initiated following the discovery of precontact cultural materials during monitoring of the construction of a natural gas pipeline in the summer of 1999. Alliance Pipeline Ltd. (Calgary) contracted the heritage resource firm of FMA Heritage Resources Consultants Inc. (Calgary) to conduct archaeological monitoring of the pipeline right-of-way during topsoil stripping and pipeline trenching. The quality, quantity, and range of archaeological materials recovered from the two sites prompted the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation to recommend detailed archaeological study of sites EgNn 9 and EgNo 23 following pipeline construction. Archaeological testing and excavation was conducted by FMA Heritage Resources Consultants Inc. (FMA) during the summer of 2000 while additional excavation in 2001 was jointly undertaken by employees of FMA and students from the Department of Archaeology, University of Saskatchewan. Comprehensive analysis of all materials recovered during the 1999 monitoring and 2000 and 2001 testing programs was undertaken by students at the Department of Archaeology, University of Saskatchewan. Excavation at sites EgNn 9 and EgNo 23 revealed repeated use of the area by precontact populations dating to the Middle Precontact and Late Precontact periods. The focus of this thesis is the intact Pelican Lake and Besant occupations encountered at both sites.

1.2 Chapter Summaries

Archaeological sites EgNn 9 and EgNo 23 are located within a distinctive environmental setting. The Douglas Park Sandhills afforded precontact inhabitants of

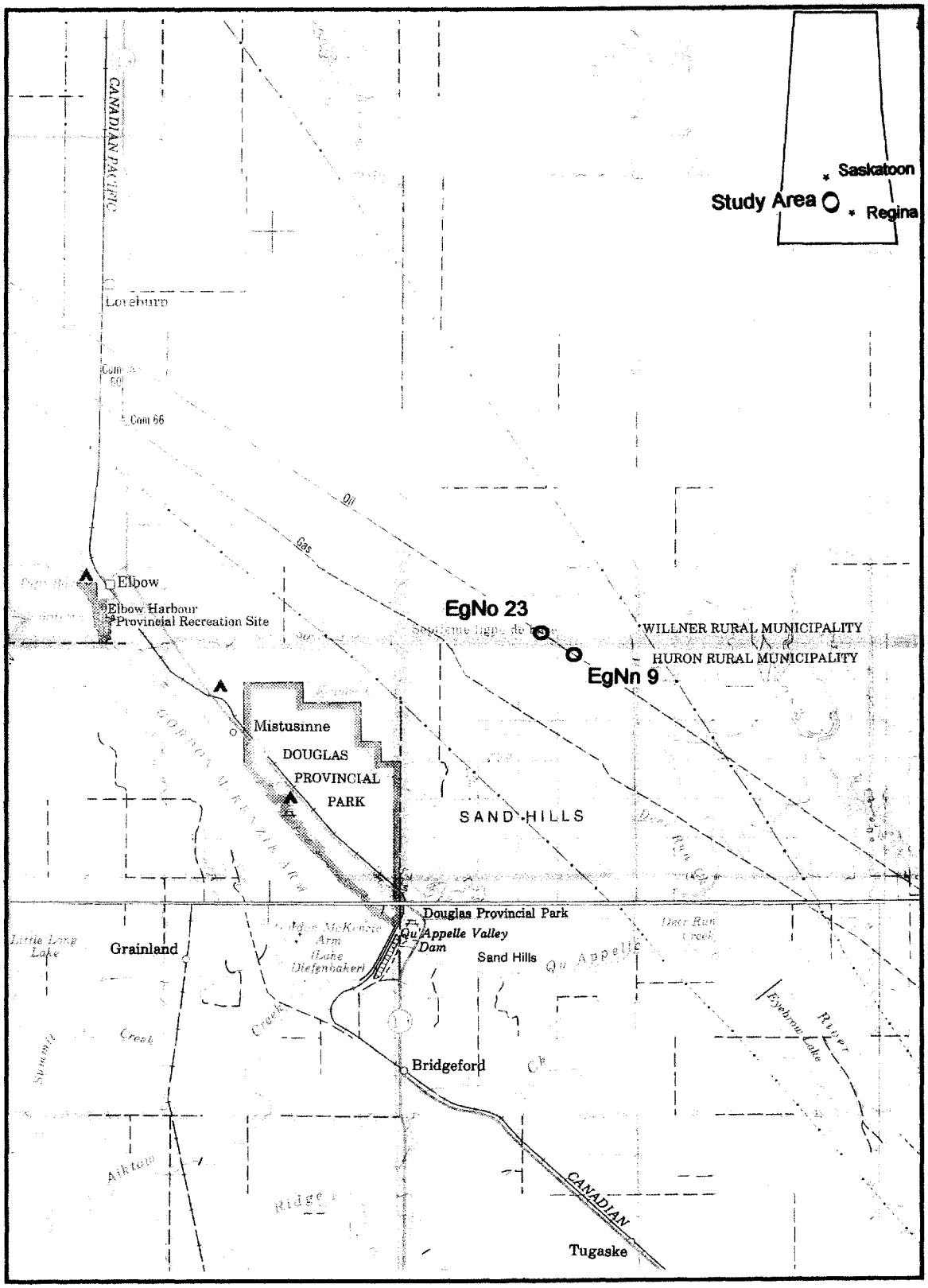


Figure 1.1 Location of study area. (Source - 1:250000 NTS maps 72O and 72J, Surveys and Mapping Branch, Department of Energy, Mines and Resources)

the region access to a wide array of natural resources. Chapter 2 consists of a summary of the physical environment and plant and animal resources available to inhabitants of the site area. Chapters 3 and 4 include a detailed description of the archaeological investigations conducted at site EgNn 9. Chapter 3 deals with the initial identification of the site during the summer of 1999 and the assessment program conducted in the summer of 2000. Chapter 4 presents the results of the 2001 field season and the block excavations carried out by employees of FMA and students of the Department of Archaeology. Chapters 5 and 6 provide detailed information regarding site EgNo 23. Chapter 5 includes a brief discussion of archaeological investigation conducted at previously recorded site EgNo 23. Chapter 6 consists of a detailed discussion of the upper Besant and Pelican Lake phase occupations at site EgNo 23 and a summary of the lower occupations of the site. Chapter 7 provides an introduction to precontact utilization of the grasslands environment of the Great Plains and to the more specialized sandhill ecoregions across the Plains. Information regarding archaeological sites excavated within sandhills across the Great Plains and throughout the archaeological record is also included in chapter 7. Chapter 8 deals with the cultural chronology developed for the archaeological record for the Great Plains and an introduction to some of the issues regarding taxonomic systems. A detailed discussion of the Besant and Pelican Lake phases of Plains prehistory including information recovered during excavation of archaeological sites across the northern Great Plains is also provided in chapter 8. Chapter 9 consists of a summary of the materials included in the previous chapters and ties the information gathered during investigations at sites EgNn 9 and EgNo 23 into the larger picture of Plains prehistory. Due to the durable nature of the lithic materials utilized by precontact populations, lithic tools form a large component of the artifact assemblages recovered at archaeological sites. Therefore information regarding the lithic assemblages recovered at sites EgNn 9 and EgNo 23 is included in this thesis. Appendix A consists of a detailed description of the formed lithic tools recovered from site EgNn 9 while appendix B is comprised of a detailed description of the formed lithic tools from site EgNo 23. Appendix C includes a compilation of radiocarbon dates associated with the Pelican Lake, Sandy Creek, and Besant phases from the Canadian Archaeological Radiocarbon Database website (Morlan 2005) and from the archaeological sites discussed in this thesis.

CHAPTER 2
ENVIRONMENTAL SETTING

The natural environment provided the precontact human populations of the Canadian Plains with all the resources necessary for successful adaptation to the grasslands region. Precontact populations developed an intimate and extensive knowledge of the Plains environment including the location and seasonal availability of its resources. While archaeological theory has moved beyond a focus on environmental determinism, an understanding of the archaeological cultures found across the Canadian Plains must include a discussion of the natural setting in which the cultures operated. An understanding of the resources available to precontact populations can provide the archaeologist with insight into some aspects of precontact culture, such as possible seasonal round scheduling or hunting strategies. Archaeological sites EgNn 9 and EgNo 23 are located within the heart of the Canadian Plains, therefore, the following chapter includes a description of the region and its present-day resources.

The landscape of the Canadian Plains was created by glacial action as the Laurentide Ice Sheet advanced and retreated across the region during the Quaternary geological period. The massive ice sheet deformed and entrapped fragments of the underlying bedrock formed during earlier geological events and blanketed the plains with till deposits. Glacial drift within the region form important sources of groundwater while the immense volumes of meltwater that flowed from the retreating ice sheet carved deep channels in the till and underlying bedrock creating the major river valleys of the Plains (Storer 1989). The sediment and water sources created by glaciation supported the flora and fauna which sustained the human occupants of the Canadian Plains. Glaciation was also key in shaping the physical setting of the Canadian Plains.

2.1 Physiography

Multicomponent archaeological sites EgNn 9 and EgNo 23 are situated within the gently undulating landscape characteristic of much of the Canadian Plains. Glaciation has created a varying landscape of moraines, eskers, kames, parabolic dunes, lacustrine and outwash plains, and deltas (deBoer and Martz 1999). The site area is located within the Second Prairie Level which is bounded by the Manitoba Escarpment to the east and the Missouri Coteau to the west. The Manitoba Escarpment consists of the major landforms of the Pembina, Tiger, Porcupine, and Pasquia Hills, in addition to Riding Mountain and Duck Mountain. The Missouri Coteau is a major northwest/southeast trending ridge along the west side of the South Saskatchewan River which terminates with the Bear Hills and the Eagle Hills to the north. These heights of land represent the ends of bedrock wedges laid down by ancient inland seas along the edge of the Canadian Shield during the Palaeozoic geological period (Trenhaile 1998). Within the Second Prairie Level the landscape is marked by uplands such as the Allan Hills located to the northeast of the sites and the Vermillion and Eyebrow Hills located south of the site area (deBoer and Martz 1999). These uplands, and the other small hills within the region, rise gradually from the general prairie level. Other locations of major topographic relief within the site area consist of the deeply entrenched river valleys associated with the South Saskatchewan and Qu'Appelle rivers (deBoer and Martz 1999:91).

Archaeological sites EgNn 9 and EgNo 23 are located along the northern edge of a series of sandhills associated with Douglas Provincial Park on the east side of the Gordon McKenzie arm of Lake Diefenbaker. Site EgNn 9 is located within gently undulating native prairie in an area of stabilized sand dunes. Site EgNo 23 is situated within the same system of stabilized sand dunes but in a level cultivated field approximately 1000 meters northwest of site EgNn 9. The sandhill regions found across the Canadian Plains represent post-glacial wind distribution of sands, silts, and clays deposited as deltas where meltwater channels entered glacial lakes. Major sandhill regions in southern Saskatchewan include the Harris, Dundurn, and Dunfermline Hills to the north and the Great Sand Hills to the southwest of the site area (Epp 1986). The sandhills associated with Douglas Provincial Park were created from the sands deposited as meltwaters entered Glacial Lake Regina and Glacial Lake Saskatchewan (Christiansen 1979).

2.2 Climate

The Douglas Park Sandhills are located with the Moist Mixed Grassland Ecoregion or Mixed Prairie vegetation zone which exhibits a continental climate characterized by seasonal temperature extremes (Acton et al. 1998, Thorpe 1999). The ecoregion is located in the interior of the continent which means the climate is not affected by oceanic influences. The climate is dominated by a diversity of air masses and can be affected by regional features and local topography such as hills and large lakes (Lundqvist 1999). Continental climates exhibit seasonal maximum temperatures soon after summer solstice and seasonal minimum temperatures soon after winter solstice. The region surrounding sites EgNn 9 and EgNo 23 has displayed decadal climatic fluctuations ranging from mid-latitude steppe to humid continental recorded during the years between AD 1911 to 1990 (Lundqvist 1999:96). Key to the mid-latitude steppe climatic region is large water deficits resulting from higher rates of water evaporation to rates of precipitation. Winters are cold, though not as extreme nor long as in other regions, and summers are warm, if not hot. The humid continental climatic region exhibits long and cold winters, and warm summers (Lundqvist 1999).

The Moist Mixed Grassland Ecoregion exhibits temperatures ranging from high monthly means of 18.4 degrees Celsius in July to lows of -16.7 degrees Celsius in January (Acton et al. 1998). The mean annual precipitation level for the ecoregion is 383 millimeters, varying from a monthly mean accumulation of 70 millimeters in July to 14 millimeters in February (Acton et al. 1998). The province of Saskatchewan as a whole exhibits a light snowfall average compared to the rest of Canada and is notably subject to frequent severe droughts (Lundqvist 1999). The Saskatchewan climate is also characterized by the occurrence of thunderstorms and these storms provide a significant proportion of growing-season rainfall. However, thunderstorms may also be destructive as they produce hail, intense lightning, torrential rains and extremely strong winds which occasionally develop into tornadoes (Paul 1999).

Past climatic conditions in the site area fluctuated, creating slightly different conditions than those presently experienced. The Holocene geological epoch marks the final retreat of the Laurentide Ice Sheet which covered the majority of the region now known as the Canadian Plains. As the ice sheet receded proglacial lakes and

meltwater spillways formed along the margins of the glacier and the newly exposed landmass experienced a cool moist climate (Aitken 2002). The beginning of the Holocene is marked by an increasingly warm dry climate which peaked during an interval referred to as the Altithermal. The Altithermal, or mid-Holocene Warm Period, was characterized by much drier and warmer climatic conditions and dates to approximately 8000 to 6000 years before present (BP) (Wolfe 2002). By approximately 5000 years BP climatic conditions had become cooler and moister with this trend broken only briefly by a short, warm dry period at approximately 1000 years BP (Wolfe 2002). These general climatic conditions existed across the Canadian Plains, but as with the present-day climate, regional variations must have existed. The record of past climatic conditions across the Canadian Plains is contained within lacustrine sediments recovered during scientific coring of lake sediments. Cool moist climates are indicated by the presence of tree pollens and evidence of rising water levels while dry warm conditions are indicated by the presence of grass and herb pollens and lower water levels (Aitken 2002). Climatic conditions determine the type of vegetation and wildlife supported within the region and hence the resources available to the precontact inhabitants of the area. Precontact human utilization of the Canadian Plains followed the pattern of deglaciation for the region during the Holocene. With the receding of the glacially-fed waterbodies, the resultant cool moist climate allowed for the establishment of an open spruce woodland across the early post-glacial landscape As the Laurentide Ice Sheet receded farther north, warmer and drier climatic conditions prevailed and by approximately 12000 years BP most of southern Saskatchewan supported a grassland environment similar to present-day grasslands.

2.3 Hydrology

The major surface water sources in the immediate vicinity of sites EgNn 9 and EgNo 23 are the South Saskatchewan River and the Qu'Appelle River. The South Saskatchewan River provides a high volume, reliable supply of good quality water to the region. The river's sources begin in the Rocky Mountains of Alberta and include the Red Deer, Bow, and Oldman rivers. The South Saskatchewan River runs through a region of very low runoff which contributes to the river's high quality (SaskWater 1999). The 'elbow' in the South Saskatchewan River, a prominent landmark in the region, is located approximately 20 kilometers to the west of sites EgNn 9 and

EgNo 23. The Qu'Appelle River, on the other hand, is characterized by extreme variability in seasonal flow. High volumes of spring runoff, largely in the form of snow melt, fill the tributaries of the Qu'Appelle River generally between the months of March to May. This runoff produces 90% of the river's total volume hence the seasonal and temporal variability of the river (SaskWater 1999). The bend at the northern end of the Qu'Appelle River (now inundated) is located approximately 15 kilometers southeast of sites EgNn 9 and EgNo 23. The character of both of these rivers has been drastically altered following completion of the Gardiner and Qu'Appelle dams in 1967.

The gently undulating landscape of the site area is characterized by a series of 'potholes' or knob-and-kettle topography where glaciation has created a series of small surface water-bodies. As the glaciers retreated across the Canadian Plains blocks of ice calved off and were buried in the moraine. The ice melted, overlying deposits of moraine till collapsed inward leaving depressions surrounded by low hills; the so-called knob-and-kettle topography (Storer 1989). The numerous potholes or 'kettles' within the region fill with snow melt and rainfall and provide an important, though transitory, source of surface water. Topographic maps show a series of small seasonal water sources throughout the vicinity of sites EgNn 9 and EgNo 23 in the form of sloughs and shallow drainage systems.

In addition to surface water sources, the land component of the water cycle includes groundwater sources. The presence, quality, and dynamic nature of groundwater resources are determined by geology, climate, topographic expression and composition of surface materials (Acton et al. 1998). Groundwater plays an important role as a water source in the region due to the limited availability of surface waters in southern Saskatchewan (Maathuis 1999). The groundwater resources in the Moist Mixed Grassland Ecoregion are associated with bedrock aquifers and with the glacial drift that covers the bedrock. Bedrock refers to sediments deposited before the onset of glaciation and in the study area the sands of the Judith River Formation form the bedrock aquifer (Maathuis 1999). Drift refers to all materials directly deposited by glaciers or by glacial water during the advances and retreats of glaciers, and drift aquifers are located between the top of the bedrock and beneath the present ground surface (Maathuis 1999). The study area also contains surficial

aquifers which are common in the sandy glacial lake deltas present in the vicinity of the South Saskatchewan River (Acton et al. 1998). Groundwater is derived from precipitation which infiltrates the subsurface saturation zones and re-emerges in the form of springs or seepages. As such, the quantity and quality of groundwater resources is variable, similar to surface water resources.

2.4 Vegetation

Sites EgNn 9 and EgNo 23 are located within the Moist Mixed Grassland Ecoregion of the Prairie Ecozone (Acton et al. 1998), also referred to as the Mixed Prairie vegetation zone (Thorpe 1999). The Moist Mixed Grassland represents the northernmost extension of the open grasslands which extend from the high plains of Texas northward into southern Saskatchewan, Alberta, and Manitoba; the so-called Great Plains of North America. Within the Moist Mixed Grassland the uplands are dominated by grass species while the lowlands, which are generally moister, support a variety of shrubs and trees. The ecoregion is "home of the mid-grasses (wheatgrasses and speargrasses)" (Acton et al. 1998:144). Mid-grass species include western porcupine grass (*Stipa curtiseta*), western wheat grass (*Pascopyrum smithii*), northern wheat grass (*Agropyron dasystachyum*), green needle grass (*Stipa viridula*) and needle-and-thread grass (*Stipa comata*). The most common short grass species present in the ecoregion is blue grama (*Bouteloua gracilis*). Also present are species ranging between short and mid grasses including June grass (*Koeleria macrantha*) and plains reed grass (*Calamagrostis montanensis*). A variety of short sedges and broad-leaved species are present throughout the ecoregion including thread-leaved sedge (*Carex filifolia*), sun-loving sedge (*Carex pennsylvanica*), low sedge (*Carex eleocharis*), pasture sage (*Artemisia frigida*), moss phlox (*Phlox hoodii*), small-leaved everlasting (*Antennaria microphylla*), scarlet mallow (*Sphaeralcea coccinea*), and prairie crocus (*Anemone patens*). Broad-leaved herbs form a small, but brightly coloured proportion of the biomass in the mixed prairie and include such species as milk-vetches (*Astralus* spp.) and golden-bean (*Thermopsis rhombifolia*) (Thorpe 1999). The soil surface beneath the grasses and forbs generally consists of a mat-like cover of clubmoss (*Selaginella densa*) with the occasional occurrence of lichens. The Moist Mixed Grassland Ecoregion also exhibits the "regular alternation between woodland, shrubland, and grassland that characterized the Aspen Parkland" (Acton et

al. 1998:144). As the name suggests, the Grassland Ecoregion differs from the parkland due to the dominance of grasses, with the woodlands and shrublands much reduced in size and generally confined to coulees and slough margins.

Sites EgNn 9 and EgNo 23 are situated along the northern boundary of the sandhills associated with Douglas Provincial Park and sandy soils within the Moist Mixed Grassland support a variety of grasses and forbs which are rare or absent in other habitats (Acton et al. 1998). Sandy soils within the ecoregion also allow for the rapid infiltration of rainfall which provides easily accessible water for plants (Acton et al. 1998). Species which thrive in sandy soils include sand reed grass (*Calamovilfa longifolia*), sand dropseed (*Sporobolus cryptandrus*), Canada wild rye (*Elymus canadensis*), Indian rice grass (*Oryzopsis hymenoides*), prairie sunflower (*Helianthus couplandii*), hairy golden aster (*Heterotheca villosa*), lance-leaved psoralea (*Psoralea lanceolata*), and skeletonweed (*Lygodesmia juncea*). Shrublands and woodlands also thrive in hollows within stabilized sand dunes as these hollows are generally associated with areas of high water tables, and as such, more readily support deep-rooted woody species (Thorpe 1999). Shrubs and trees found within these hollows includes wolf-willow (*Elaeagnus commutata*), creeping juniper (*Juniperus horizontalis*), choke cherry (*Prunus virginiana var melanocarpa*), saskatoon (*Amelanchier alnifolia*), prairie rose (*Rosa arkansana*), Wood's rose (*Rosa woodsii*), western snowberry (*Symphoricarpos occidentalis*), hawthorn (*Crataegus* spp.), buffaloberry (*Shepherdia argentea*), willow (*Salix* spp.), river birch (*Betula occidentalis*) and aspen (*Populus tremuloides*). The understory consists of species not seen elsewhere in the ecoregion including such herbs as western Canada violet (*Viola canadensis var rugulosa*), smooth aster (*Aster laevis*), showy aster (*Aster conspicuus*), and small bedstraw (*Galium trifidum*), and grasses including hay sedges (*Carex* spp.) and bluegrasses (*Poa* spp.). This heavier than usual woody cover associated with sandy soils within the Moist Mixed Grassland contributes to the possible classification of the dunesand blocks as outliers of the Aspen Parkland, an ecoregion located north of the mixed prairie. Sites EgNn 9 and EgNo 23 are located along the northern edge of the Elbow dunesand block (Thorpe 1999). The sites are situated within the Eyebrow Plain Landscape Area and the majority of the area's sand dunes are pasture, including PFRA community pastures (Acton et al. 1998:154).

Wetlands form an important component of the Moist Mixed Grassland Ecoregion or Mixed Prairie vegetation zone, and like the woodlands and shrublands in the mixed prairie, the wetlands support vegetation species common in the more northerly Aspen Parkland Ecoregion. Grasses, sedges and rushes include marsh reed grass (*Calamagrostis canadensis*), northern reed grass (*Calamagrostis stricta ssp inexpansa*), Kentucky bluegrass (*Poa pratensis*), fowl bluegrass (*Poa palustris*), reed canary grass (*Phalaris arundinacea*), giant reed grass (*Phragmites australis*), spangletop (*Scolochloa festucacea*), awned sedge (*Carex atherodes*), beaked sedge (*Carex rostrata*), creeping spike-rush (*Eleocharis palustris*), Baltic rush (*Juncus balticus*), bulrushes (*Scirpus* spp.), cat-tail (*Typha latifolia*), water smartweed (*Polygonum amphibium*), and pondweeds (*Potamogeton* spp.). Increased salinity in the wetlands is reflected by the presence of such species as saltgrass (*Distichlis spicata*), Nuttall's alkali grass (*Puccinellia nuttalliana*), desert saltgrass (*Distichlis stricta*), red samphire (*Salicornia rubra*), sea blite (*Suaeda depressa*), and alkali bulrush (*Scirpus paludosus*) (Thorpe 1999).

As has been noted, major river valley complexes located near the site area include the South Saskatchewan River and the headwaters of the Qu'Appelle River. The steep north-facing valley slopes support poplar (*Populus* spp.) and ash (*Fraxinus* spp.) woodlands in areas where the uplands are treeless. Stream banks sustain riparian woods of green ash (*Fraxinus pennsylvanica*), cottonwoods (*Populus* spp.), and Manitoba maple (*Acer negundo*). In areas with accelerated erosion, sparse vegetation cover includes grasses such as prairie muhly (*Muhlenbergia cuspidata*), weedy forbs including broomweed (*Gutierrezia diversifolia*) and rubberweed (*Hymenoxys richardsonii*), and prickly pear cactus (*Opuntia polyacantha*) (Thorpe 1999).

2.5 Wildlife

The varying vegetation and habitats within the Moist Mixed Grassland Ecoregion support a wide range of mammals and birds and, to a lesser extent, fish, reptiles and amphibians. At least 78 species of mammals were present during precontact occupation of the ecoregion and of particular interest to precontact human populations were the large nomadic herds of bison (*Bison bison*), elk (*Cervus*

elaphus), and pronghorn (*Antilocapra americana*) which dominated the landscape. Also of economic value to the inhabitants were the species which preyed on these herds including grizzly bear (*Ursus arctos*), wolves and coyote (*Canis* sp.), mountain lion (*Felis concolor*), and wolverine (*Gulo gulo*) (Wapple 1999). Additional mammal species which have been identified within the grasslands including such large mammals as mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), lynx (*Lynx canadensis*), black bear (*Ursus americanus*), and occasionally moose (*Alces alces*) (Acton et al. 1998). Small mammals which would have been of interest to the precontact peoples inhabiting the area include porcupine (*Erethizon dorsatum*), muskrat (*Ondatra zibethicus*), white-tailed jack rabbit (*Lepus townsendii*), snowshoe hare (*Lepus americanus*), Nuttall's or mountain cottontail (*Sylvilagus nuttallii*), beaver (*Castor canadensis*), striped skunk (*Mephitis mephitis*), least weasel (*Mustela nivalis*), long-tailed weasel (*Mustela frenata*), red fox (*Vulpes vulpes*), mink (*Mustela vison*), badger (*Taxidea taxus*), river otter (*Lutra canadensis*), and raccoon (*Procyon lotor*) (Wapple 1999).

Of the 9,100 species of birds known in the world, 414 species were recorded in the province of Saskatchewan by the end of 1998 (Smith 1999). The province provides a permanent residence for some bird species, is an important breeding ground for others, and is a key migration resting area for many bird species. The Moist Mixed Grassland Ecoregion is the breeding ground for such waterfowl and shorebird species as Canada goose (*Branta canadensis*), American white pelican (*Pelecanus erythrorhynchos*), green-winged teal (*Anas crecca*), pied-billed grebe (*Podilymbus podiceps*), American coot (*Fulica americana*), double-crested cormorant (*Phalacrocorax auritus*), Great Blue heron (*Ardea herodias*), spotted sandpiper (*Actitis macularia*), and common snipe (*Gallinago gallinago*). Raptors with breeding grounds in the Moist Mixed Grasslands include burrowing owl (*Speotyto cunicularia*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), common nighthawk (*Chordeiles minor*), northern harrier (*Circus cyaneus*), and American kestrel (*Falco sparverius*). Numerous land birds also use the ecoregion as their breeding grounds and include such readily identifiable species as western meadowlark (*Sturnella neglecta*), mourning dove (*Zenaida macroura*), yellow warbler (*Dendroica petechia*), red-winged blackbird (*Agelaius phoeniceus*), killdeer (*Charadrius vociferus*),

and brown-headed cowbird (*Molothrus ater*). Among the bird species which make the Moist Mixed Grassland their wintering ground, only one waterfowl species, the mallard (*Anas platyrhynchos*), is currently identified. Other species which winter in the ecoregion include sharp-tailed grouse (*Tympanuchus phasianellus*), great horned owl (*Bubo virginianus*), gyrfalcon (*Falco rusticolus*), golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), American robin (*Turdus migratorius*), black-billed magpie (*Pica pica*), cedar waxwing (*Bombycilla cedrorum*), black-capped chickadee (*Parus atricapillus*), rock dove (*Columba livia*), and Downy woodpecker (*Picoides pubescens*) (Acton et al. 1998, Smith 1999, Whitman 1988).

Fish diversity represented in the Moist Mixed Grassland Ecoregion is notable with 41 species of fish currently identified in the waterways of the ecoregion and 58 species native to the province as a whole (Acton et al. 1998, Merkowsky 1999). While game fish did not serve as a major food source for the precontact populations of southern Saskatchewan, fish resources were available for those groups who did not have a cultural prohibition against such food. Large shallow lakes and slow-moving turbid rivers provide a habitat for such species as burbot (*Lota lota*), walleye (*Stizostedion vitreum*), pike (*Esox* sp.), and perch (*Perca* sp.) while the Saskatchewan River system continues to support such species as goldeye (*Hiodon alosoides*) and sturgeon (*Acipenser* sp.) (Merkowsky 1999).

Reptiles and amphibians are present across the province though in much smaller numbers than the previously discussed animals. The distribution of the 12 species of reptiles and seven species of amphibians identified in Saskatchewan reflects the variety of ecosystems present in the province (Didiuk 1999). The dry grasslands provide habitat for species more commonly found farther to the south while riparian habitats support species found to the east. The Moist Mixed Grassland Ecoregion is currently the home of such amphibian species as boreal chorus frog (*Pseudacris triseriata*), northern leopard frog (*Rana pipiens*), wood frog (*Rana sylvatica*), Plains spadefoot toad (*Spea bombifrons*), Canadian toad (*Bufo hemiophrys*), and tiger salamander (*Ambystoma tigrinum*) while the plains garter snake (*Thamnophis radix*) is the most common reptile present.

CHAPTER 3
SITE EgNn 9 : PRELIMINARY INVESTIGATION

Archaeological site EgNn 9 is a multicomponent campsite representing precontact utilization of the sandhills region through approximately the last 5000 years. The cultural components were assigned relative dates through the analysis of the projectile points recovered in association with the buried occupation floors. Cultural material was recovered during three years of archaeological investigation including surface collection of the newly disturbed sediments conducted in 1999, controlled testing and the excavation of one meter by one meter (1m x 1m) test units in 2000, and controlled block excavation in 2001. The following section consists of a summary of the first two seasons of investigation while chapter 4 contains a detailed description of the final season's results. A complete description of all lithic tools recovered during monitoring and excavation conducted in the three seasons of archaeological investigation at the site is contained in Appendix A.

3.1 Initial Identification and Analysis (Permit 99-19)

Site EgNn 9 was first identified during archaeological monitoring of the Alliance Pipeline Limited gas pipeline by employees of FMA Heritage Resources Consultants Inc. (Calgary), the heritage consultants contracted by Alliance Pipeline Limited (Calgary) to conduct the Heritage Resources Impact Assessment of the pipeline project. Precontact period cultural material was recovered from the newly disturbed sediments within the 32 meter wide pipeline corridor. The cultural material collected included 74 faunal specimens, 91 pieces of firebroken rock, 34 finished lithic tools / tool fragments, 56 expediency tools / tool fragments, 22 lithic cores / core fragments, and 651 pieces of lithic debitage.

The faunal remains collected from the pipeline right-of-way (Table 3.1) included 17 elements which could be identified as bison (*Bison bison*), of which four specimens were classified as female or calf, one element as male or large female while the remaining specimens could not be assigned a specific gender or age classification. Nine of the faunal specimens were identified as being robust enough to assign to the general classification of large artiodactyl and probably are associated with the bison specimens already identified. The remaining 48 faunal specimens were too fragmentary to allow determination of the specific element or species, and include 39 unaltered indeterminate bone and tooth enamel fragments and nine calcined indeterminate bone fragments. The presence of calcined faunal remains and firebroken rock indicate that the site area had been used by precontact populations for habitation and food processing, in addition to hunting. As would be expected the collected samples of firebroken rock (Table 3.2) reflected the utilization of locally available lithic materials for the construction of hearths and boiling pits.

Finished lithic tools (Table 3.3) recovered from the pipeline corridor include six projectile points / point fragments, two biface / biface fragments, six preforms / preform fragments, 16 scrapers / scraper fragments, and four wedges. Four of the six projectile points are complete enough to assign to an archaeological time period and include a complete, reworked Late Precontact triangular point (Cat.No. 5) manufactured of Swan River chert. Also collected was a projectile point base fragment which has been assigned to the Avonlea phase (Cat.No. 2). The projectile point base is well finished and manufactured of Swan River chert. A complete, asymmetric projectile point, tentatively identified as Sandy Creek (Cat.No. 3), was also recovered from the disturbed sediments within the pipeline corridor. The Sandy Creek projectile point is manufactured of a yellow chert that has been classified as Montana chert. A projectile point base fragment made of grey porcellanite was also collected and has been classified as Pelican Lake (Cat.No. 1). The final two projectile point fragments collected during monitoring of the pipeline right-of-way are too fragmentary to identify as to cultural complex, and are manufactured of Swan River chert (Cat.No. 7) and Knife River flint (Cat.No. 711).

Table 3.1 : Faunal material recovered from disturbed sediments, site EgNn 9, Permit 99-19.

TAXON / GENDER / AGE	SIDE / ELEMENT	COUNT	WEIGHT (gm)
Bison / female or calf	right astragalus	1	39.1
	right calcaneus	1	93.5
	right unciform carpal	1	11.0
	left first phalanx	1	25.7
Bison / male or large female	right first phalanx	1	59.2
Bison / indeterminate	indeterminate molar fragment	2	39.1
	indeterminate vertebrae fragment	3	64.6
	indeterminate rib fragment	1	39.9
	right rib fragment	1	17.8
	indeterminate metapodial fragment	1	13.9
	indeterminate metacarpal fragment	1	182.4
	left tibia fragment	2	124.0
	left first phalanx	1	8.5
Artiodactyl	indeterminate premolar fragment	2	25.4
	indeterminate long bone fragment	4	146.7
	indeterminate calcaneus fragment	1	19.7
	indeterminate phalanx fragment	2	16.5
Indeterminate	unaltered bone and tooth enamel	39	95.6
	calcined fragment	9	10.2
	total	74	1032.8

Table 3.2 : Firebroken rock recovered from disturbed sediments, site EgNn 9 Permit 99-19.

MATERIAL TYPE	COUNT	WEIGHT (gm)
miscellaneous coarse grained	75	1589.0
quartzite / hard cobble	16	922.2
total	91	2511.2

Table 3.3 : Finished lithic tools recovered from disturbed sediments, site EgNn 9, Permit 99-19.

TOOL TYPE	MATERIAL TYPE	CAT. NO.
Late Period triangular projectile point	Swan River chert	5
Avonlea projectile point base fragment	Swan River chert	2
Sandy Creek projectile point	Montana chert	3
Pelican Lake projectile point	grey porcellanite	1
projectile point base fragment	Knife River flint	711
projectile point base fragment	Swan River chert	7
biface	Swan River chert	4
biface fragment	yellow chalcedony	18
preform	Swan River chert	6
preform fragment	white quartz	66
preform fragment	silicified wood	34, 92, 94
preform fragment	Swan River chert	69
end-and-side scraper	brown chalcedony	10, 14, 20
end-and-side scraper	grey chalcedony	17
end-and-side scraper	brown chert	19
end-and-side scraper	Swan River chert	8, 11, 160
endscraper	silicified wood	15, 21
endscraper	Swan River chert	9, 13, 203
sidescraper	brown chert	22
reverse scraper	yellow quartzite	37
scraper fragment	brown chert	30
wedge	grey chert	26
wedge	Swan River chert	33, 142, 144

An additional eight finished bifacial tools or tool fragments were collected from the disturbed sediments within the pipeline corridor and include a well finished, tear-drop shaped biface manufactured of Swan River chert (Cat.No. 4). A single biface fragment made of patinated yellow chalcedony was also collected (Cat.No. 18). A complete preform manufactured of Swan River chert (Cat.No. 6) was recovered from the pipeline right-of-way. Five preform fragments were also collected during

monitoring and all represent tools broken during manufacture. One of the preform fragments is manufactured of Swan River chert (Cat.No. 69), one is made of white quartz (Cat.No. 66), and three are manufactured of silicified wood (Cat. No. 34, 92, and 94).

Sixteen lithic tools display the patterned retouch and shaping which creates scraping tools for working hide, wood, or bone. Eight of the scrapers recovered during pipeline monitoring display patterned steep-angle retouch along the distal and at least one lateral edge of the form to create end-and-side scrapers. Three end-and-side scrapers are manufactured of Swan River chert (Cat.No. 8, 11, 160), two end-and-side scrapers are manufactured of patinated brown chalcedony (Cat.No. 10, 20) while single examples of patinated brown chert (Cat.No. 19) and grey chalcedony (Cat.No. 17) were also recovered. The final end-and-side scraper (Cat.No. 14) represents a thumbnail scraper manufactured of patinated brown chalcedony. The disturbed sediments of the pipeline right-of way also contained five endscrapers, of which three are manufactured of Swan River chert (Cat.No. 9, 13, 203) and two are made of silicified wood (Cat.No. 15, 21). The remaining scraping tools recovered during monitoring include a single sidescraper made of brown chert (Cat.No. 22), a single scraper fragment of patinated brown chert (Cat.No. 30), and a large reverse scraper made of yellow quartzite (Cat.No. 37). The final four finished lithic tools recovered from the disturbed sediments of the pipeline corridor consist of three Swan River chert wedges (Cat.No. 33, 142, 144) and a grey chert wedge (Cat.No. 26).

A total of 56 expediency tools were recovered from the pipeline right-of-way during monitoring. A single yellow quartzite retouched cobble spall (Cat.No. 743), 46 retouched flakes / retouched flake fragments, and nine utilized flakes / utilized flake fragments were collected. The expediency tools were manufactured from the full array of lithic materials represented at the site (Table 3.4).

Cores and debitage from all stages of stone tool manufacture and repair were also collected from the pipeline right-of-way. A total of 22 cores were collected and include eight multidirectional cores, four exhausted bipolar cores, one unidirectional core, two failed or test cores, four core fragments, and three flake cores which may be

Table 3.4 : Expediency lithic tools recovered from disturbed sediments, site EgNn 9, Permit 99-19.

TOOL TYPE	MATERIAL TYPE	CAT.NO.
retouched cobble spall	yellow quartzite	743
retouched flake	grey chalcedony	170
retouched flake	yellow chalcedony	300
retouched flake	grey chert	703
retouched flake	tan chert	24
retouched flake	grey porcellanite	25
retouched flake	grey quartzite	48, 737, 759
retouched flake	red quartzite	27
retouched flake	yellow quartzite	765
retouched flake	silicified wood	98, 106, 168, 291, 293, 302, 303, 328, 685, 699
retouched flake	Knife River flint	322, 384, 705
retouched flake	Swan River chert	23, 28, 31, 32, 36, 38, 70, 77, 113, 172, 181, 186, 193, 206, 235, 254, 269, 295, 311, 347, 415, 620, 656
utilized flake	yellow chalcedony	148
utilized flake	red chert	130
utilized flake	yellow chert	197
utilized flake	silicified wood	175, 292
utilized flake	Knife River flint	16
utilized flake	Swan River chert	62, 192, 228

early stage preforms (Table 3.5). Almost half of the cores collected are Swan River chert (45.5%, n = 10) while quartzite is the second most common material represented (31.8% , n=7). The remaining cores are made of quartz (13.6% , n=3), miscellaneous coarse grained material (4.5% , n=1) and silicified wood (4.5% , n=1). Surface collection of the disturbed sediments of the site resulted in the recovery of a total of 651 pieces of debitage. Early lithic reduction stages comprise 21.4% (n=139) of the total collection while second stage reduction is represented by 18.7% (n=122) of the total surface collection. Final stage lithic reduction is represented by 27.5% (n=179) while the remainder of the debitage collected from the pipeline corridor

Table 3.5 : Cores recovered from disturbed sediments, site EgNn 9, Permit 99-19.

CORE TYPE	MATERIAL TYPE	CAT.NO.
exhausted bipolar	white quartz	109, 285
exhausted bipolar	Swan River chert	128, 238
flake core/early stage preform	miscellaneous coarse grained	754
flake core/early stage preform	yellow quartzite	744
flake core/early stage preform	Swan River chert	739
multidirectional	white quartz	43
multidirectional	grey quartzite	42
multidirectional	yellow quartzite	47
multidirectional	Swan River chert	40, 44, 45, 46
exhausted multidirectional	Swan River chert	63
unidirectional	yellow quartzite	742
failed / test	red quartzite	746, 752
core fragment	purple quartzite	741
core fragment	silicified wood	107
core fragment	Swan River chert	65, 120

consists of flake fragments and shatter totaling 32.4% of the assemblage (n=211). The debitage assemblage is dominated by locally available materials such as Swan River chert, silicified peat, silicified wood, quartzite, cherts, and chalcedonies (Table 3.6). Lithic material types which may be consider trade materials, including Cathead chert and Knife River flint, comprise a very small percentage of the debitage assemblage (0.8%). Due to the disturbed nature of the sediments from which the lithic assemblage was recovered a detailed discussion regarding patterns of material type preference is not possible although the projectile points collected from the pipeline corridor indicate that the materials are associated with at least four separate occupations of the site.

Table 3.6 : Lithic material types represented by debitage recovered from disturbed sediments, site EgNn 9, Permit 99-19.

MATERIAL TYPE	COUNT	% OF TOTAL
arenaceous chert	1	0.2
chalcedony	36	5.5
chert	42	6.5
feldspathic siltstone	1	0.2
miscellaneous coarse grained	6	0.9
miscellaneous fine grained	4	0.6
quartz	19	2.9
quartzite	80	12.3
quartzose	4	0.6
silicified peat	20	3.0
silicified siltstone	2	0.3
silicified wood	44	6.8
Cathead chert	2	0.3
Knife River flint	3	0.5
Swan River chert	387	59.4
total	651	100

3.1.1 Summary of 1999 Season (Permit 99-19)

The presence of calcined bone fragments, firebroken rock, finished lithic tools, and lithic debitage from all stages of lithic reduction suggested precontact use of the site area for long-term habitation. The recovery of complete, identifiable faunal elements indicated that information regarding the seasonality of use of the site area, the game species utilized by precontact inhabitants of the area, and herd composition of the game species could be discerned through analysis of excavated materials. Finished lithic tools recovered from the pipeline right-of-way included a Late Precontact Period triangular projectile point, a Sandy Creek phase projectile point, and two projectile point base fragments tentatively classified as Avonlea and Pelican Lake. The projectile points and projectile point fragments demonstrate the repeated use of the site area by precontact populations. Further archaeological investigation of the multicomponent site was recommended to and approved by the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation (FMA Heritage Resources Consultants 2002a).

3.2 Preliminary Excavation and Analysis (Permit 2000-31)

Archaeological investigation during the second field season at site EgNn 9 was aimed at identifying the areal extent of the site, and determining the presence and range of any buried cultural occupations at the site. Shovel tests and 1m x 1m excavation units were placed on both the north and south sides of the pipeline right-of-ways (Figure 3.1). Testing revealed that cultural materials are present in buried contexts on both sides of the Alliance and Enbridge pipeline corridors which bisect the site. Surface collection of materials from the pipeline right-of-ways was also conducted in 2000. Three finished tools, four expediency tools, and ten pieces of lithic debitage were recovered from the disturbed sediments within the Alliance and Enbridge pipeline corridors. The finished tools include an end-and-side scraper of Swan River chert (Cat.No. 1107), an endscraper made of Swan River chert (Cat.No. 1099), and a wedge also of Swan River chert (Cat.No. 1110). The expediency tools consist of four retouched flakes / flake fragments, one each of grey chert (Cat.No. 1102), white quartz (Cat.No. 1113), grey quartzite (Cat.No. 1100), and Swan River chert (Cat.No. 1098). The ten pieces of lithic debitage collected from the pipeline right-of-ways represent all stages of lithic reduction with early stage reduction represented by 30 % (n=3) of the collection. Second stage reduction is represented by two flakes (20%), final stage reduction by three flakes (30%) while the rest of the surface collection consists of two flake fragments (20%). The surface collection debitage is comprised of locally available materials including quartzite (n=1, 10%), silicified wood (n=1, 10%), and Swan River chert (n=8, 80%).

3.2.1 Shovel Tests and Excavation Units South of the Pipeline Corridors

A total of 14 shovel tests (Shovel Tests # 26 - # 39) were placed to the south of the pipeline corridors which bisect site EgNn 9 (Figure 3.1). Only four of the tests proved positive for the presence of buried cultural materials. Excavation units were placed immediately adjacent to the positive tests, therefore, the materials recovered in the shovel tests will be discussed in conjunction with the materials recovered during excavation.

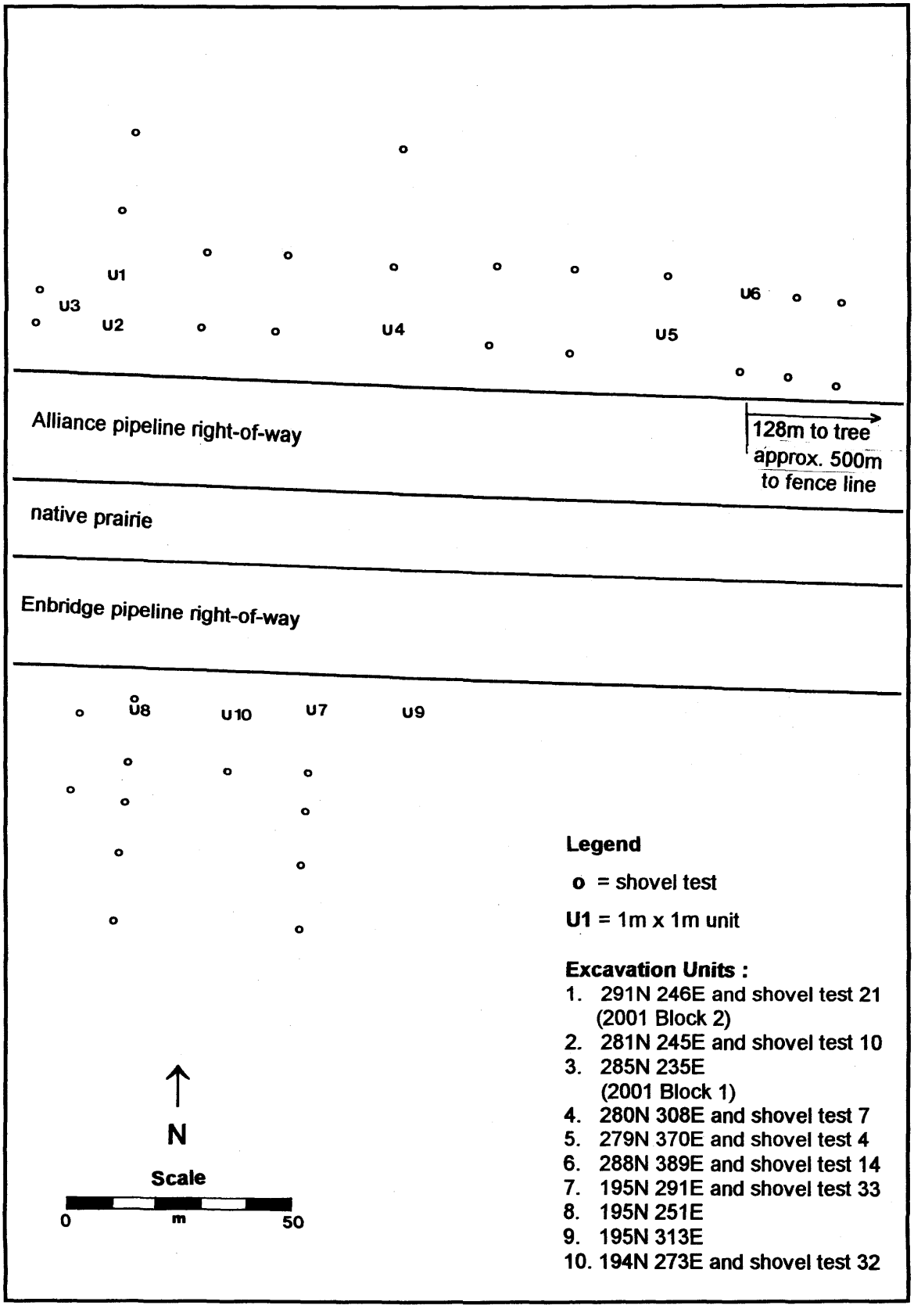


Figure 3.1 Site map showing 2000 season test units and shovel tests, site EgNn 9.

3.2.1-1 Unit 195N 251E and Shovel Test # 31

Excavation and shovel testing within this unit extended to a total depth of 50 centimeter (cm) below ground surface (BS) and resulted in the recovery of a total of 23 faunal specimens, five pieces of firebroken rock, two finished tools, five expediency tools, one core, and 52 pieces of lithic debitage. Cultural materials were recovered from three of the five arbitrary levels excavated. No time diagnostic artifacts nor dateable materials were recovered. Excavation was conducted in ten centimeter levels with the first two levels proving sterile of cultural material. Level 3 (20 - 30 cm) contained three firebroken rock fragments of miscellaneous coarse grained material weighing a total of 0.3 grams. A single biface fragment of Swan River chert (Cat.No. 857) was recovered from the shovel test adjacent to the unit within sediments associated with level 3. Level 3 also contained ten pieces of debitage representing all stages of lithic reduction from early stage (n=1, 10%), second stage (n=1, 10%) to final stage (n=6, 60%) with two flake fragments / shatter (20%) completing the assemblage. Debitage recovered from level 3 is dominated by Swan River chert and other locally available materials (Table 3.7).

Table 3.7 : Lithic material types represented by debitage recovered from 195N 251E and shovel test # 31, site EgNn 9, Permit 00-31.

MATERIAL TYPE	LEVEL 3		LEVEL 4		LEVEL 5	
	count	%	count	%	count	%
arenaceous chert	0	0	7	24.1	2	15.4
argillite	0	0	1	3.5	0	0
chalcedony	1	10	0	0	1	7.7
chert	0	0	1	3.5	0	0
miscellaneous coarse	0	0	0	0	2	15.4
quartzite	2	20	2	6.9	0	0
quartzose	0	0	1	3.5	1	7.7
silicified wood	0	0	3	10.3	0	0
Gronlid siltstone	0	0	1	3.5	0	0
Swan River chert	7	70	13	44.8	7	53.9
total	10	100	29	100.1	13	100.1

Level 4 (30 - 40 cm) contained eight indeterminate bone and tooth enamel fragments weighing a total of 2.3 grams, of which three fragments are burned (1.1 gm). Two pieces of miscellaneous coarse grained material firebroken rock weighing a total of 111.1 grams were also collected during excavation. Lithic artifacts recovered from level 4 include a biface fragment of feldspathic siltstone (Cat.No. 1086), five retouched flake / flake fragments of Swan River chert (Cat.No. 1042, 1057, 1075, 1076) and silicified wood (Cat.No. 1046), and one exhausted multidirectional core of quartz (Cat.No. 1043). Lithic debitage (n=29) is dominated by locally available materials (Table 3.7) and represents all stages of lithic reduction. Early stage reduction is represented by one flake (3.5%), second stage by four flakes (13.8%), and final stage by eight flakes (27.6%). The assemblage is dominated by flake fragments / shatter (n=16, 55.2%).

Level 5 was the final arbitrary level excavated in unit 195N 251E and consists of the faunal remains and lithic debitage recovered from depths of 40 - 50 cm. Faunal materials collected include 15 indeterminate bone and tooth enamel fragments weighing a total of 6.9 grams. Three of the faunal fragments are burned(1.5 gm). A total of thirteen pieces of lithic debitage were also recovered during excavation and include a single second stage flake (7.7%), five final stage flakes (38.5%), and seven flake fragments / shatter (53.9%). The assemblage is dominated by locally available materials (Table 3.7).

3.2.1-2 Unit 195N 291E and Shovel Test # 33

Excavation of the unit was conducted in 10 cm levels and extended to a depth of 60 cm below ground surface. Only level 1 (0 - 10 cm) proved sterile of cultural materials. The remaining excavated levels (2 through 6) produced a total of 20 faunal remains, five pieces of firebroken rock, two finished tools, one expediency tool, one core, and 16 items of lithic debitage which were collected from the excavation unit and the shovel test. Artifacts collected from the shovel test could not be directly correlated with the excavation levels and may be associated with one or more of the arbitrary levels excavated. Shovel test # 33 produced two unaltered indeterminate tooth enamel fragments weighing 1.1 grams and two final stage lithic flakes manufactured of Swan River chert. These artifacts were collected from sediments between 20 - 50

cm below ground surface and as such may be associated with levels 3, 4, or 5 of the associated excavation unit.

Excavation of level 2 resulted in the recovery of three pieces of firebroken rock including two fragments of hard cobble / quartzite weighing a total of 18.2 grams and a single fragment of miscellaneous coarse grained material weighing 69.7 grams. A single projectile point fragment of silicified wood (Cat.No. 1013) was recovered during excavation, however, the tool fragment is too highly damaged due to exposure to fire to be assigned to a specific archaeological culture. The artifact represents most of the body and base of a projectile point but most of the dorsal and ventral surfaces are missing due to laminar fracture. Though incomplete, the dimensions of the point fragment suggest that the artifact can be classified as a dart point. Level 2 also contained a single expediency tool, a retouched flake manufactured of Swan River chert (Cat.No. 1012). Five pieces of lithic debitage complete the assemblage of artifacts recovered from level 2. Second stage lithic reduction is indicated by a single secondary flake (20%) with the remainder of the debitage collection consisting of two final stage flakes (40%) and two flake fragments / shatter (40%). The sparse debitage assemblage is dominated by locally available material (Table 3.8).

Table 3.8 : Lithic material types represented by debitage recovered from 195N 291E, site EgNn 9, Permit 00-31.

MATERIAL TYPE	LEVEL 2		LEVEL 3		LEVEL 4	
	count	%	count	%	count	%
quartzite	0	0	2	28.6	0	0
silicified peat	0	0	1	14.3	0	0
silicified wood	0	0	1	14.3	0	0
Knife River flint	1	20	0	0	0	0
Swan River chert	4	80	3	42.9	2	100
total	5	100	7	100.1	2	100

Level 3 contained two unaltered indeterminate bone and tooth enamel fragments weighing 2.9 grams. Two pieces of hard cobble / quartzite firebroken rock weighing a total of 13.3 grams were also recovered from level 3. The lithic assemblage from level 3 consists of seven pieces of debitage representing all stages of lithic reduction. The debitage assemblage includes early stage (n=1 , 14.3%),

second stage (n=2 , 28.6%), final stage (n=2 , 28.6%), and flake fragments / shatter (n=2 , 28.6%). The lithic assemblage is comprised exclusively of locally available materials (Table 3.8). The occupation represented in level 3 appears to be short-term precontact campsite.

Cultural materials recovered in level 4 include six faunal specimens consisting of a single burned tooth enamel fragment (0.1 gm) from an indeterminate species and five indeterminate bone fragments weighing a total of 2.0 grams. A single projectile point base was recovered during excavation and the silicified peat fragment (Cat.No. 1024) appears to be a broken Besant point. The lithic assemblage collected from level 4 consists of a single multidirectional core manufactured of Swan River chert (Cat.No. 1030) and two flake fragments also of Swan River chert (Table 3.8).

Cultural materials recovered from the remaining arbitrary levels in unit 195N 291E consist solely of faunal remains. Level 5 produced four unaltered indeterminate bone and tooth enamel fragments weighing 1.6 grams. Level 6 contained six indeterminate bone and tooth enamel fragments weighing a total of 0.9 grams, of which four fragment were burned (0.4 gm).

3.2.1-3 Unit 195N 313E and Shovel Test # 26

Only faunal remains were recovered from this farthest southeast section of the site. Eight unaltered indeterminate bone and tooth enamel fragments weighing a total of 2.6 grams were recovered during excavation of level 8. An additional two unaltered indeterminate bone and tooth enamel fragments weighing 0.8 grams were collected from shovel test # 26 at a depth of 20 - 50 cm below ground surface. The absence of other cultural materials from the excavation unit and associated shovel test precludes assigning these sparse faunal remains to past human use of this portion of the site.

3.2.1-4 Unit 194N 273E and Shovel Test # 32

Excavation resulted in the recovery of cultural materials from four of the five arbitrary levels extending to a maximum depth of 50 cm below ground surface. A total of five faunal specimens and 11 pieces of lithic debitage were recovered during excavation and shovel testing. The single final stage Swan River chert flake

recovered from shovel test # 32 could not be assigned to a specific excavation level. The flake was found within sediments removed at a depth of 20 - 40 cm so may be associated with either level 3 or level 4.

Level 1 proved sterile of cultural materials while level 2 produced three faunal specimens weighing a total of 3.1 grams. One of the faunal specimens is a possible rib fragment (2.1 gm) which can not be identified as to species, with the remainder of the faunal assemblage consisting of two unaltered indeterminate bone and tooth enamel fragments (1.0 gm). Level 3 produced a single burned indeterminate bone fragment weighing 0.4 grams and a single unaltered indeterminate bone fragment weighing 0.1 grams. Three pieces of lithic debitage of locally available materials (Table 3.9) were also recovered, and include a single second reduction stage flake (33.3%), a single final stage flake (33.3%), and a single flake fragment (33.3%).

Table 3.9 : Lithic material types represented by debitage recovered from 194N 273E, site EgNn 9, Permit 00-31.

MATERIAL TYPE	LEVEL 3		LEVEL 4		LEVEL 5	
	count	%	count	%	count	%
chalcedony	0	0	1	25	1	33.3
quartz	1	33.3	0	0	0	0
quartzite	1	33.3	0	0	0	0
Swan River chert	1	33.3	3	75	2	66.7
total	3	99.9	4	100	3	100

Levels 4 and 5 of unit 194N 273E produced lithic debitage of locally available materials (Table 3.9) but no other cultural materials. Level 4 contains four pieces of debitage including a single early stage flake (25%), a single second stage flake (25%), and two flake fragments / shatter (50%). Level 5 produced three pieces of debitage consisting of a single second stage flake (33.3%) and two flake fragments / shatter (66.7%).

3.2.2 Shovel Tests and Excavation Units North of the Pipeline Corridors

A total of 25 shovel tests and six 1m x 1m excavation units were placed across the gently undulating terrain on the north side of the pipeline corridors during the 2000

season. Eleven of the shovel tests produced evidence of buried cultural materials and the 1m x 1m units were positioned to maximize exposure of the buried cultural remains. Two of the shovel tests (# 10 and # 14) were directly expanded upon and the results will be discussed in association with the excavation unit materials. Two of the 1m x 1m units (285N 235E and 291N 246E) were further expanded during the 2001 season and are discussed in conjunction with the block excavation results in chapter 4.

3.2.2-1 Shovel Tests

Nine shovel tests produced cultural material including faunal specimens, firebroken rock, and lithic debitage but were not directly expanded during either the 2000 nor 2001 field season. Shovel test # 3 rendered a single final stage flake of quartzite from a depth of 20 - 40 cm BS while shovel test # 8 produced a single flake fragment of Swan River chert also from a depth of 20 - 40 cm BS. Materials were recovered from a depth of 20 - 40 cm BS in shovel test # 9 and consist of a calcined indeterminate bone fragment weighing 0.6 grams, an unaltered indeterminate bone fragment weighing 0.2 grams, and a bipolar core of silicified wood (Cat.No. 839). Shovel tests # 15, # 18, and # 22 produced cultural materials from depths of 20 - 40 cm BS and include a single flake fragment of silicified peat in # 15, a single flake fragment of Swan River chert in # 22, and one piece of miscellaneous coarse grained material firebroken rock weighing 68.1 grams and one early stage flake of quartzite in shovel test # 18. Excavation of shovel test # 23 resulted in the recovery of materials from a greater depth with the collection of three pieces of miscellaneous coarse grained material firebroken rock weighing 24.7 grams, a final stage flake of Knife River flint, and a flake fragment of silicified wood from 75 - 90 cm BS. Shovel tests # 24 and # 25 rendered artifacts from a depth of 20 - 40 cm BS. Shovel test # 25 produced a single calcined indeterminate bone fragment weighing 0.1 grams while test # 24 contained one burned indeterminate bone fragment weighing 0.1 grams, one unaltered indeterminate bone fragment weighing 0.1 grams, and a single final stage flake of Swan River chert.

3.2.2-2 Unit 279N 370E

Excavation of the unit was conducted in 10 cm levels to a depth of 90 cm below ground surface and resulted in the recovery of a total of 16 faunal specimens,

four fragments of firebroken rock, one finished lithic tool, and 30 pieces of lithic debitage. The upper two levels proved sterile of cultural materials while excavation of level 3 resulted in the recovery of two pieces of lithic debitage. The early stage flake (50%) and flake fragment (50%) from level 3 are both of quartzite, a locally available material (Table 3.10). The sparse artifact recovery from level 3 precludes the classification of specific site function represented in this component of the site.

Level 4 produced a single unaltered indeterminate bone fragment weighing 0.1 grams and two pieces of quartzite debitage (Table 3.10). The debitage includes a single final stage flake and a single flake fragment. Excavation of level 5 resulted in the recovery of only highly fragmented faunal materials including five unaltered indeterminate bone and tooth enamel fragments weighing 1.1 grams and a single calcined indeterminate bone fragment weighing 0.2 grams.

Table 3.10 : Lithic material types represented by debitage recovered from 279N 370E, site EgNn 9, Permit 00-31.

MATERIAL TYPE	LEVEL 3		LEVEL 4		LEVEL 5		LEVEL 6		LEVEL 7	
	count	%	count	%	count	%	count	%	count	%
chert	0	0	0	0	0	0	1	33.3	0	0
feldspathic siltstone	0	0	0	0	0	0	0	0	1	4.3
quarrtzite	2	100	2	100	0	0	2	66.7	8	34.8
silicified peat	0	0	0	0	0	0	0	0	1	4.3
silicified wood	0	0	0	0	0	0	0	0	9	39.1
Swan River chert	0	0	0	0	0	0	0	0	4	17.4
total	2	100	2	100	0	0	3	100	23	99.9

Level 6 of unit 279N 370E produced only lithic materials including a biface fragment of Swan River chert (Cat.No. 972), one early reduction stage flake (33.3%), one final stage flake (33.3%), and one flake fragment (33.3%). The lithic assemblage consists of locally available materials (Table 3.10). Excavation of level 7 in unit 279N 370E resulted in recovery of nine unaltered indeterminate bone and tooth enamel fragments weighing a total of 8.2 grams. Level 7 also produced four pieces of hard cobble / quartzite firebroken rock weighing 29.0 grams and 23 pieces of lithic debitage. The debitage consists of locally available materials (Table 3.10) and represents all stages of lithic reduction. Level 7 produced three early stage flakes

(13.0%), two second stage flakes (8.7%), eight final stage flakes (34.8%), and 10 flake fragments / shatter (43.5%). The final two levels of unit 279N 370E, levels 8 and 9, proved sterile of cultural material.

3.2.2-3 Unit 280N 308E

Excavation of this unit extended to a depth of 70 cm below ground surface and resulted in the recovery of materials from four of the seven arbitrary levels. The unit produced a total of 15 faunal specimens, four fragments of firebroken rock, three finished lithic tools, one core, and 29 pieces of lithic debitage. The first three levels proved sterile of cultural materials while excavation of level 4 produced a single indeterminate tooth enamel fragment weighing 0.5 grams and a single early stage flake of chert (Table 3.11).

Table 3.11 : Lithic material types represented by debitage recovered from 280N 308E, site EgNn 9, Permit 00-31.

MATERIAL TYPE	LEVEL 4		LEVEL 5		LEVEL 6		LEVEL 7	
	count	%	count	%	count	%	count	%
arenaceous chert	0	0	0	0	1	6.3	0	0
chalcedony	0	0	1	12.5	0	0	0	0
chert	1	100	0	0	0	0	1	25
feldspathic siltstone	0	0	1	12.5	0	0	0	0
quartzite	0	0	6	75	6	37.5	2	50
silicified peat	0	0	0	0	1	6.3	0	0
silicified wood	0	0	0	0	1	6.3	0	0
Knife River flint	0	0	0	0	1	6.3	0	0
Swan River chert	0	0	0	0	6	37.5	1	25
total	1	100	8	100	16	100.2	4	100

Level 5 produced two fragments of miscellaneous coarse grained material firebroken rock weighing 214.4 grams and a single end-and-side scraper of yellow quartzite (Cat.No. 935). Eight pieces of lithic debitage were also collected from level 5 and represent locally available materials (Table 3.11). The debitage assemblage includes two second stage flakes (25%), a single final stage flake (12.5%), and five flake fragments / shatter (62.5%).

Excavation of level 6 resulted in the collection of 11 unaltered indeterminate bone and tooth enamel fragments weighing 4.0 grams. Two pieces of miscellaneous coarse grained material firebroken rock weighing 84.8 grams and a single scraper fragment of Swan River chert (Cat.No. 957) were also recovered. The lithic assemblage recovered in level 6 consists of 16 pieces of debitage dominated by locally available materials (Table 3.11). All stages of lithic reduction are represented within the assemblage including a single early stage flake (6.3%), two second stage flakes (12.5%), eight final stage flakes (50%), and five flake fragments / shatter (31.3%).

The final arbitrary level excavated in unit 280N 308E, level 7, produced a single calcined indeterminate bone fragment weighing 0.3 grams and two unaltered indeterminate bone fragments weighing 0.3 grams. The lithic assemblage consists of a wedge of grey chalcedony (Cat.No. 962), an exhausted bipolar core of silicified wood (Cat.No. 964), and four pieces of debitage. The debitage collection is comprised of locally available materials (Table 3.11) and includes one second stage flake (25%), two final stage flakes (50%), and a single flake fragment (25%).

3.2.2-4 Unit 281N 245E and Shovel Test # 10

Cultural materials were recovered from four arbitrary levels during excavation and shovel testing in association with this unit. A total 14 faunal specimens, 22 pieces of firebroken rock, a single Besant projectile point, two expediency tools, and 12 pieces of lithic debitage were collected during excavation of 10 cm levels extended to a depth of 60 cm below ground surface.

Level 1 proved sterile of cultural materials while level 2 produced three unaltered indeterminate bone and tooth enamel fragments weighing 1.3 grams and two final lithic reduction stage flakes. The lithic materials represent a locally available material (Swan River chert) and a trade material (Knife River flint) (Table 3.12).

The total count of cultural materials assigned to level 3 include the artifacts recovered from shovel test # 10, in addition to the materials recovered from the excavation unit. The cultural material from the shovel test was collected from a depth

of 20 - 40 cm below ground surface and as such could be assigned to level 3 or level 4. Due to the fact that excavation of level 4 proved sterile of cultural material it is assumed that the shovel test materials can be confidentially be combined with the materials from level 3. Level 3 produced a total of five unaltered indeterminate bone and tooth enamel fragments weighing 8.8 grams. Ten pieces of firebroken rock were also recovered and include eight fragments of miscellaneous coarse grained material weighing 185.3 grams and two hard cobble / quartzite fragments weighing 28.4 grams. The lithic assemblage of level 3 includes a Besant projectile point of Swan River chert (Cat.No. 840) and a utilized flake of Knife River flint (Cat.No. 841). The well finished projectile point appears to have been reworked to compensate for an impact fracture which damaged the tip. The Besant projectile point was recovered during shovel testing. The remainder of the lithic assemblage from level 3 consists of two early stage flakes (66.7%) and a single flake fragment (33.3%). The debitage is comprised of locally available materials (Table 3.12).

Table 3.12 : Lithic material types represented by debitage recovered from 281N 245E and Shovel Test # 10, site EgNn 9, Permit 00-31.

MATERIAL TYPE	LEVEL 2		LEVEL 3		LEVEL 4		LEVEL 5		LEVEL 6	
	count	%	count	%	count	%	count	%	count	%
quartzite	0	0	2	66.7	0	0	1	25	0	0
silicified wood	0	0	0	0	0	0	0	0	1	33.3
Knife River flint	1	50	0	0	0	0	2	50	0	0
Swan River chert	1	50	1	33.3	0	0	1	25	2	66.7
total	2	100	3	100	0	0	4	100	3	100

Level 5 produced three unaltered indeterminate bone and tooth enamel fragments weighing 2.3 grams. Two pieces of miscellaneous coarse grained material firebroken rock weighing 5.7 grams were also collected. The lithic assemblage of level 5 consists a single retouched flake of Swan River chert (Cat.No. 899) and four pieces of debitage. The two final lithic reduction stage flakes (50%) and two flake fragments (50%) are manufactured of locally available materials and possible trade materials (Table 3.12).

Level 6, the final arbitrary level completed in unit 281N 245E, produced three indeterminate tooth enamel fragments weighing 1.1 grams. A total of 10 pieces of

firebroken rock were also collected and include seven miscellaneous coarse grained material fragments weighing 292.6 grams and three hard cobble / quartzite fragments weighing 10.7 grams. The lithic assemblage consists of three final reduction stage flakes of locally available materials (Table 3.12).

3.2.2-5 Unit 288N 389E and Shovel Test #14

Excavation and shovel testing extended to a depth of 80 cm below ground surface and produced a total of five faunal specimens, one piece of firebroken rock, one core, and 13 pieces of lithic debitage. Level 1 proved sterile of cultural material while level 2 produced a single unaltered indeterminate bone fragment weighing 1.2 grams. Levels 3 and 4 also proved sterile of cultural material. Shovel test # 14 produced a single final reduction stage flake of silicified wood from a depth of 20 - 40 cm below ground surface. The depth corresponds with levels 3 and 4 of the excavation unit, both of which proved sterile during excavation. Therefore the single flake may be associated with either basal deposits in level 2 or upper sediments of level 5.

Level 5 contains two unaltered indeterminate bone fragments weighing 0.7 grams and a single early reduction stage flake of quartzite (Table 3.13). Level 6 produced a single unaltered indeterminate bone fragment weighing 0.5 grams and four pieces of debitage, all of locally available material (Table 3.13). The debitage includes two early stage flakes (50%) and two flake fragments (50%).

Table 3.13 : Lithic material types represented by debitage recovered from 288N 389E, site EgNn 9, Permit 00-31.

MATERIAL TYPE	LEVEL 5		LEVEL 6		LEVEL 7		LEVEL 8	
	count	%	count	%	count	%	count	%
chert	0	0	0	0	1	33.3	0	0
feldspathic siltstone	0	0	0	0	0	0	1	25
miscellaneous coarse	0	0	0	0	1	33.3	1	25
quartzite	1	100	0	0	0	0	0	0
quartzose	0	0	0	0	0	0	1	25
Swan River chert	0	0	4	100	1	33.3	1	25
total	1	100	4	100	3	99.9	4	100

Level 7 contains a single unaltered indeterminate bone fragment weighing 0.1 grams, a single unidirectional core of quartz (Cat.No. 1004), and three pieces of debitage. The three flake fragments are made of locally available materials (Table 3.13). Level 8 produced a single piece of miscellaneous coarse grained material firebroken rock weighing 8.7 grams and four pieces of lithic debitage. The two final stage flakes (50%) and two flake fragments (50%) represent locally available materials (Table 3.13).

3.2.3 Summary of Shovel Testing and Excavation During the 2000 Season

Archaeological testing of site EgNn 9 during the summer of 2000 included the excavation of 39 shovel tests, ten 1m x 1m units, and the collection of cultural materials from disturbed sediments within the Alliance and Enbridge pipeline corridors. Testing revealed that the site encompasses an area of at least 100 meters north/south by approximately 160 meters east/west, with buried cultural materials extending to a depth of 90 centimeters below ground surface. Archaeological investigation confirmed that site EgNn 9 is a multicomponent site with intact buried cultural materials. Materials were recovered from varying depths within 15 of the 39 shovel tests and from all ten of the 1m x1m units. These materials confirm precontact utilization of the region, however, given the distance between the units and the lack of materials to conclusively link any of the levels together, the number of human occupations represented is unknown. The sandy sediments and post-depositional disturbances to the site mean that materials separated by more than 10 centimeters may relate to the same occupation of the site. Cultural materials recovered from more than one arbitrary level may be combined and discussed as a single occupation when evidence to correlate the levels is identified. The presence of a paleosol crosscutting more than one level could be used to link the levels based on the assumption than the paleosol represents the ground surface at the time of site use. Likewise, the refit of a lithic tool recovered from two separate arbitrary levels would suggest that the sediments within the levels relate to the same occupation. Lacking evidence to correlate the arbitrary levels, materials from each arbitrary level are assumed to represent a single occupation. These 'pockets' of cultural materials identified across site EgNn 9 may relate to a series of small-term campsites located across the site area or may represent outlying activity areas associated with larger, long-term campsites.

Likewise, separation of the occupations based on the recovery of time diagnostic materials was not possible as most of the arbitrary levels from across site EgNn 9 did not contain dateable materials. Precontact utilization by populations dating to the Besant phase was identified in two separate units, 195N 291E and 281N 245E, located on either side of the pipeline right-of-ways which bisect the site. The recovery of projectile points associated the Middle Precontact period through to the Late Precontact period indicate the site was used over a long span of time. The presence of cultural materials from more than one level in most of the excavation units also suggests than the materials represent more than one period of site utilization.

The cultural materials recovered during excavation across the site produced evidence of a wide range of precontact activities and the presence of faunal remains suggested the possibility of the recovery of dateable materials in association with the buried occupations at EgNn 9. Additional compensatory excavation was recommended by the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation. Recognizing the significance of the site Alliance Pipeline Limited contracted FMA Heritage Resources Consultants Inc. to conduct the additional excavation while the Department of Archaeology at the University of Saskatchewan was approached to complete the analysis of the archaeological materials recovered. The results of the joint venture project are discussed in the following chapter.

CHAPTER 4
SITE EgNn 9 : BLOCK EXCAVATION AND ANALYSIS

Archaeological investigation following the initial identification of site EgNn 9 determined that the site contained evidence of multiple occupations of the sandhills region. Controlled archaeological testing determined that buried deposits containing cultural materials exist on the north and south sides of the two natural gas pipelines which bisect the site (Figure 3.1). Additional archaeological excavation of site EgNn 9 was conducted by employees of FMA Heritage Resources Consultants (Calgary) and students of the Department of Archaeology at the University of Saskatchewan during the spring of 2001. Excavation was conducted under Type A (Academic) Permit # 01-45 which was held by the author. The excavation of an additional 20 square meters at site EgNn 9 was recommended by the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation based on the results of the 2000 season and due to the site's potential for significant contribution to the understanding of past human occupation of the Douglas Park sandhills (FMA Heritage Resources Consultants 2002b). Verbal approval obtained from the Heritage Resources Unit while excavation was in progress during the 2001 season permitted the expansion of Block 2 to expose intact buried occupations, and resulted in the completion of a total of 24 square meters at the site during the 2001 season. The following chapter details the results of the block excavation while Appendix A includes a complete description of all lithic tools recovered during excavation at the site.

4.1 Methodology

The 2001 field season began with the relocation of all 1m x 1m units excavated during the 2000 season. The units provided datum points for east-west and north-south baselines and created the basis for a universal grid which covered the site. The baselines were established using a compass and 100 meter chain with

the southwest corner of unit 285N 235E used as the site's horizontal datum point. The newly established grid identified slight errors in the original grid (for example 289N is actually 289.40N and 246E is actually 245.65E) but these differences have been corrected (or compensated for) allowing for accurate, if not completely precise, horizontal provenience across the entire site. Vertical control was created through the excavation of arbitrary 10 centimeter levels with depths recorded below datum (BD). Datum stakes were placed adjacent to the blocks to maintain uniform vertical measurements across the entire excavation block. Site EgNn 9 is located within very gently undulating native prairie (Figure 4.1) and excavation revealed that the arbitrary vertical levels roughly paralleled soil development revealed in each block. The arbitrary excavation levels rarely bisected buried paleosols and roughly corresponded to the soil horizons seen in wall profiles. As such, the soil horizons, and the arbitrary level or levels associated with them, were correlated to human occupation of the site. Sediments were removed through shovel shaving and hand trowelling. Whenever possible artifacts over five centimeters in size, or notable items such as lithic tools, were mapped *in situ* and collected with detailed measurements recorded. All cultural materials encountered were collected and minimally recorded by 10 centimeter level and 1m x 1m unit. All artifact concentrations and any areas of soil discoloration or varied texture were also mapped and the matrix was collected for fine screening conducted in the lab. All sediments were screened using ¼ inch (6mm) mesh while fine screening was completed using a one millimeter mesh. Curation of the collected artifacts involved dry brushing of faunal specimens and the cleaning of lithic artifacts in untreated water to gently remove loose sediments.

Archaeological excavation conducted during the spring of 2001 involved expansion on those 1m x 1m units which were believed to contain evidence of long-term habitation of site EgNn 9. It was hoped that the exposure of occupations associated with longer periods of site-use would result in the identification of a wider array of precontact activities. Large sites inhabited for longer periods of time often contain evidence of a wider array of human activities with the recovery of more discarded remains associated with such activities as hide processing, food preparation, stone tool manufacture and repair, and the hunting and butchering of game animals. Such sites also provide more chances for dating the period of site-use

Figure 4.1 General view of site EgNn 9. Wheelbarrows mark location of excavation blocks and trucks are parked on pipeline right-of-way. Valve station and site EgNo 23 visible in background. View northwest.

through the recovery of dateable materials and/or diagnostic artifacts. The test excavations located on the north side of the Alliance pipeline corridor appeared to contain such evidence of long-term site utilization in intact buried contexts. Unit 285N 235E contained a wide array of cultural materials and a diagnostic artifact, a Pelican Lake projectile point, providing a relative date of site inhabitation. An additional eleven 1m x 1m units were placed adjacent to the test unit and were designated as Block 1 during the 2001 season (Figure 4.2). Unit 291N 246E contained calcined and burned faunal remains suggesting the presence of a precontact hearth. The presence of a hearth indicated the possibility of the recovery of faunal remains which would provide evidence of seasonality of site-use and dateable materials, either charcoal or bone. The test excavation unit was expanded upon with the completion of an additional thirteen 1m x 1m units; Block 2 of the 2001 season (Figure 4.2). Sufficient distance separates the excavation blocks so it is not possible to directly correlate the occupations identified during excavation. As such, the results of each excavation block are discussed separately.

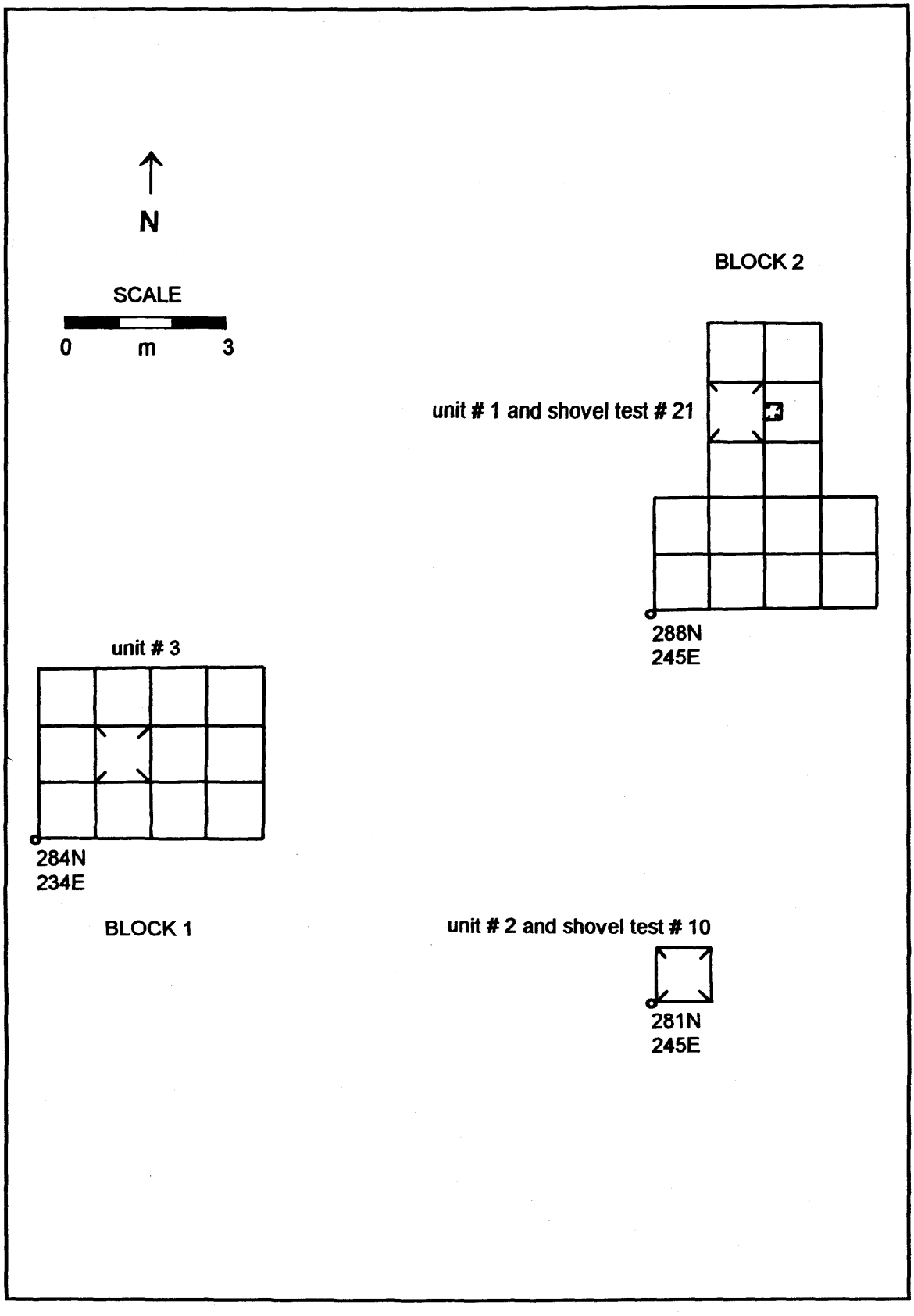


Figure 4.2 Site map showing 2001 season excavation blocks and associated 2000 season test units, site EgNn 9.

4.2 Excavation Block 1

Eight possible occupations of site EgNn 9 were identified during excavation of the twelve units which comprise Block 1. The new excavation units were dug to a depth of 100cm below ground surface (120 cm below datum). The 2000 season test unit was extend to the same depth with the excavation of the final two levels conducted during 2001.

4.2.1 Block 1, Occupation 1

Occupation 1 is represented by a light scattering of cultural materials and consists of all materials recovered in arbitrary level 1. Only two faunal specimens were collected including a single unaltered indeterminate tooth enamel fragment weighing 0.2 grams and a single burned indeterminate bone fragment weighing 0.1 grams. Eight pieces of miscellaneous coarse grained material firebroken rock from the 0-5 centimeter size category (8.5 gm) were also recovered. The lithic assemblage associated with Occupation 1 consists of a single retouched flake made of Swan River chert (Cat.No. 2502) and 13 pieces of debitage, all representing locally available materials (Table 4.1). The debitage assemblage represents all stages of lithic reduction and includes three early stage flakes (comprising 23.1% of the total assemblage), two second stage flakes (15.4 %), four final stage flakes (30.8%), and four flake fragments / shatter (30.8%). Distribution across the excavation block does not indicate the presence of specific activity areas during this undated occupation of the site. Artifact density was relatively uniform across the entire block with only two units, 285N 234E and 286N 237E, proving sterile of cultural materials. Occupation 1 is associated with the sod layer seen in wall profiles of the excavation block (Figure 4.3). Due to the slightly uneven nature of the modern ground surface some intermixing with the grey silty sand layer directly below the sod layer may have occurred during excavation.

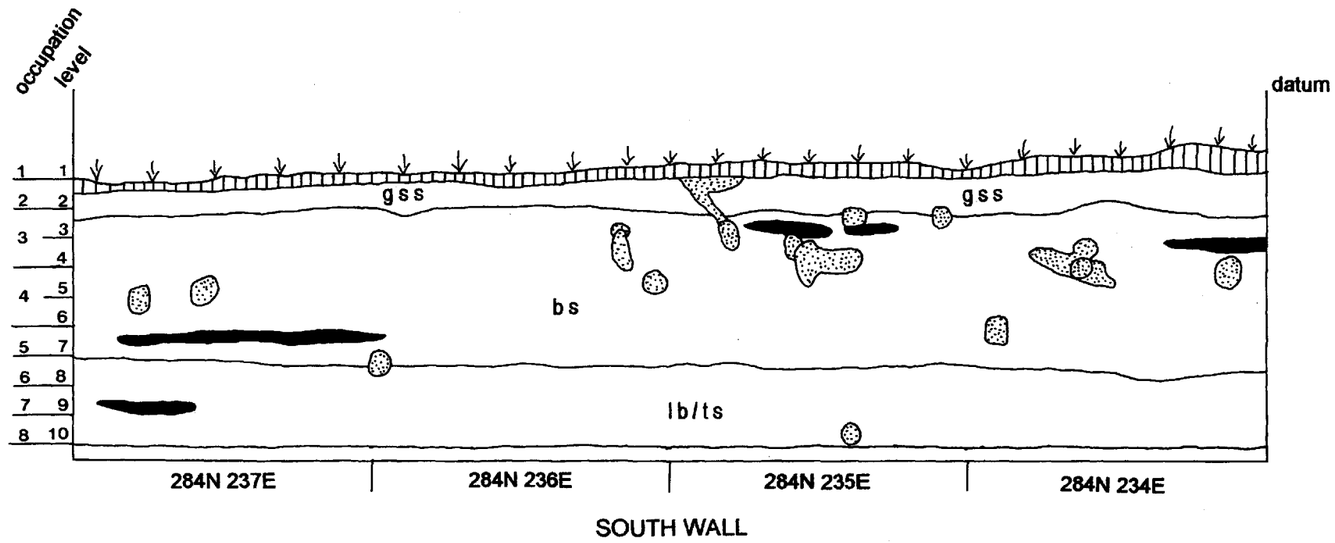
4.2.2 Block 1, Occupation 2

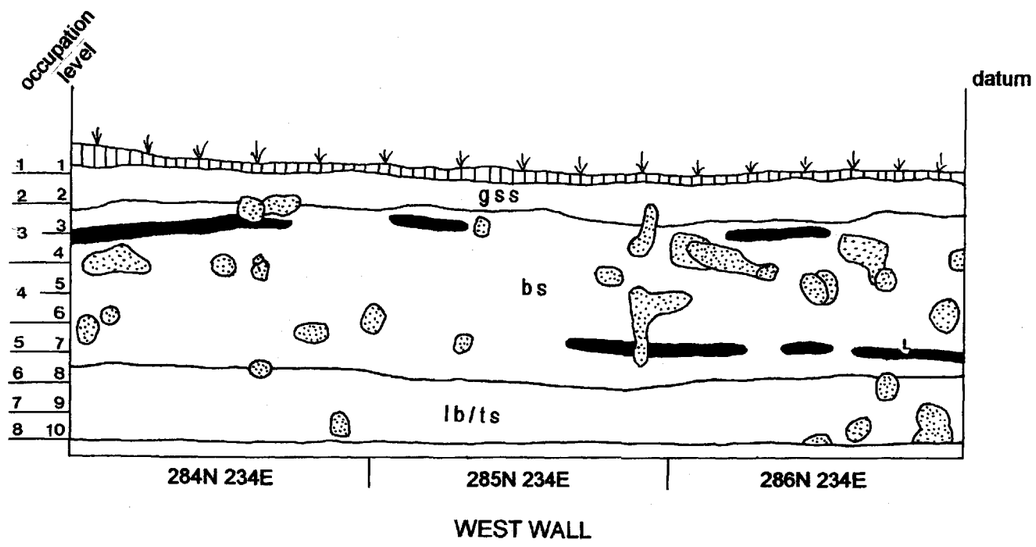
Occupation 2, consisting of the materials from arbitrary level 2, also contains a light scattering of cultural materials across the excavation block with no discernible activity areas identified. A single unaltered indeterminate bone fragment weighing 0.3

Table 4.1 : Lithic material types represented by debitage recovered from Occupations 1, 2, and 3; Block 1, site EgNn 9, Permit 01- 45.

MATERIAL TYPE	OCCUPATION 1		OCCUPATION 2		OCCUPATION 3	
	count	%	count	%	count	%
arenaceous chert	0	0	0	0	0	0
chalcedony	1	7.7	0	0	0	0
chert	3	23.1	0	0	2	12.5
feldspathic siltstone	0	0	0	0	0	0
miscellaneous coarse	1	7.7	1	14.3	0	0
miscellaneous fine	0	0	0	0	0	0
quartz	0	0	0	0	0	0
quartzite	2	15.4	1	14.3	2	12.5
quartzose	0	0	0	0	0	0
silicified peat	1	7.7	0	0	0	0
silicified siltstone	0	0	0	0	1	6.3
silicified wood	0	0	2	28.6	5	31.3
Cathead chert	0	0	0	0	0	0
Knife River flint	0	0	0	0	0	0
Swan River chert	5	38.5	3	42.9	6	37.5
total	13	100.1	7	100.1	16	100.1

grams and seven miscellaneous coarse grained material firebroken rock fragments from the 0-5 centimeter size category (32.7 gm) were collected during excavation. The lithic assemblage recovered from Occupation 2 consists of a single retouched flake of silicified peat (Cat.No. 2490) and seven pieces of debitage. The assemblage is comprised of locally available materials (Table 4.1) and includes three second stage flakes (42.9%), three final stage flakes (42.9%), and a single flake fragment / shatter (14.3%). Cultural materials were collected from all but three of the excavation units (285N 234E, 286N 236E, and 286N 237E proved sterile). The single faunal specimen was too fragmentary for radiocarbon dating and no diagnostic artifacts were collected, therefore, the occupation can not be assigned to a specific archaeological time period. Occupation 2 is associated with the grey silty sand layer seen in the wall profiles (Figure 4.3).





Legend

sod

rodent burrow

paleosol

g s s = grey sandy silt

b s = brown sand

l b / t s = light brown / tan sand

L = lithic artifact

Scale

0 cm 50

Figure 4.3 Profiles of south and west walls, Block 1, site EgNn 9.

4.2.3 Block 1, Occupation 3

The third occupation identified in Block 1 at site EgNn 9 is associated with a discontinuous paleosol visible in the profile of the block's west and south walls (Figure 4.3). The presence of the paleosol near the bottom of level 3 and the top of level 4 suggests a link between the two levels and as such the materials from levels 3 and 4 are discussed together as a single, though mixed, occupation. The materials recovered from the two arbitrary levels are assumed to represent a single occupation relating to the period of soil stability indicated by the paleosol. However, given the nature of the sediments it is possible that the materials from other occupations associated with the sandy sediments above and below the paleosol have been mixed with the materials associated with the paleosol. Lacking evidence to clearly differentiation between these possible, separate occupations, the materials from arbitrary levels 3 and 4 have been combined and are discussed as Occupation 3.

A total of 15 faunal specimens are associated with Occupation 3 and include 13 unaltered indeterminate bone and tooth enamel fragments weighing 4.7 grams, a single calcined indeterminate bone fragment (0.1 gm), and a single burned indeterminate bone fragment (0.8gm). Excavation also resulted in the collection of 21 fragments of miscellaneous coarse grained material firebroken rock weighing 97.4 grams and two pieces of hard cobble / quartzite firebroken rock weighing 7.5 grams, with all 23 pieces belonging to the 0-5 centimeter size category.

A single utilized flake of Swan River chert (Cat.No. 2503) was the only lithic tool recovered from Occupation 3. The debitage assemblage consists of locally available materials (Table 4.1) from all stages of lithic reduction. Three early reduction stage flakes (18.8%), six second stage flakes (37.5%), four final stage flakes (25.0%), and three flake fragments / shatter (18.8%) were collected during excavation of levels 3 and 4. The cultural materials were recovered across the entire block with only one unit (286N 234E) proving sterile. A slight concentration of cultural materials was noted in the northeast corner of the excavation block with approximately 40% of the total cultural material assemblage recovered from units 285N 237E and 286N 237E. However, no clearly defined activity area is suggested by this concentration of five faunal fragments, 11 pieces of firebroken rock and six

pieces of lithic debitage. The recovery of firebroken rock and bone fragments alter by heat suggest the presence of a hearth but excavation did not reveal soil staining nor concentrations of charcoal, ash, and/or firebroken rock which would demarcate such a feature. Neither diagnostic artifacts nor dateable materials were recovered from Occupation 3. As discussed previously, the cultural material appears to be associated with the paleosol and surrounding brown sand layer seen in the profiles (Figure 4.3). The upper portion of level 3 may include some materials from the upper grey silty sand layer due to the fact that the sandhills environment is subject to migrating areas of deflation creating an uneven and changing ground surface, both now and in the past.

4.2.4 Block 1, Occupation 4

Occupation 4 consists of the materials recovered in arbitrary levels 5 and 6 of Block 1 and represents utilization of site EgNn 9 during the Besant phase. The materials recovered from the two arbitrary levels are discussed as a single occupation due to the refit of a Besant projectile point. The tip of the projectile point was collected *in situ* from level 5 of unit 286N 236E while the body of the tool was recovered *in situ* from level 6 of unit 286N 237E. The soil profiles of the excavation block (Figure 4.3) indicate that Occupation 4 is associated with a brown sand layer containing numerous rodent burrows. While the occupation is not associated with a distinct paleosol, it does display a higher degree of faunal preservation than that seen in upper levels and does contain a well defined hearth.

The Besant phase occupation of site EgNn 9 is represented by a relatively dense scattering of artifacts recovered from across the entire excavation block. Excavation also resulted in the identification of a basin-shaped hearth in level 6 of units 285N 234E and 286N 234E (Figure 4.4 and 4.5). The hearth consisted of localized black staining of the sandy matrix associated with level 6 and while it contained small amounts of white ash, the feature did not show oxidation of the surrounding soil. The hearth was approximately 40 centimeters in diameter and exhibited a maximum thickness of 12 centimeters at its center. The feature displayed a flaring U-shaped profile and was most clearly defined along its western perimeter. The majority of the feature was located in unit 285N 234E and it was noted during

excavation that the entire 1m x 1m unit displayed a highly mottled appearance with black staining across the whole unit. The hearth was not noted during excavation of test unit 285N 235E in the 2000 season, however, the dark soil associated with the feature can be seen in a photograph of the unit's west wall profile, in the extreme northwest corner of the unit (FMA Heritage Resources Consultants 2002b:160). Given the highly mottled appearance of the soil due to extensive rodent burrowing, it is understandable how the eastern edge of the feature was overlooked during the 2000 and 2001 seasons. Samples of the hearth matrix were collected and fine screened using a one millimeter mesh sieve. The hearth matrix contained faunal material, firebroken rock, and lithic debitage which are discussed below in conjunction with the other materials associated with Occupation 4.

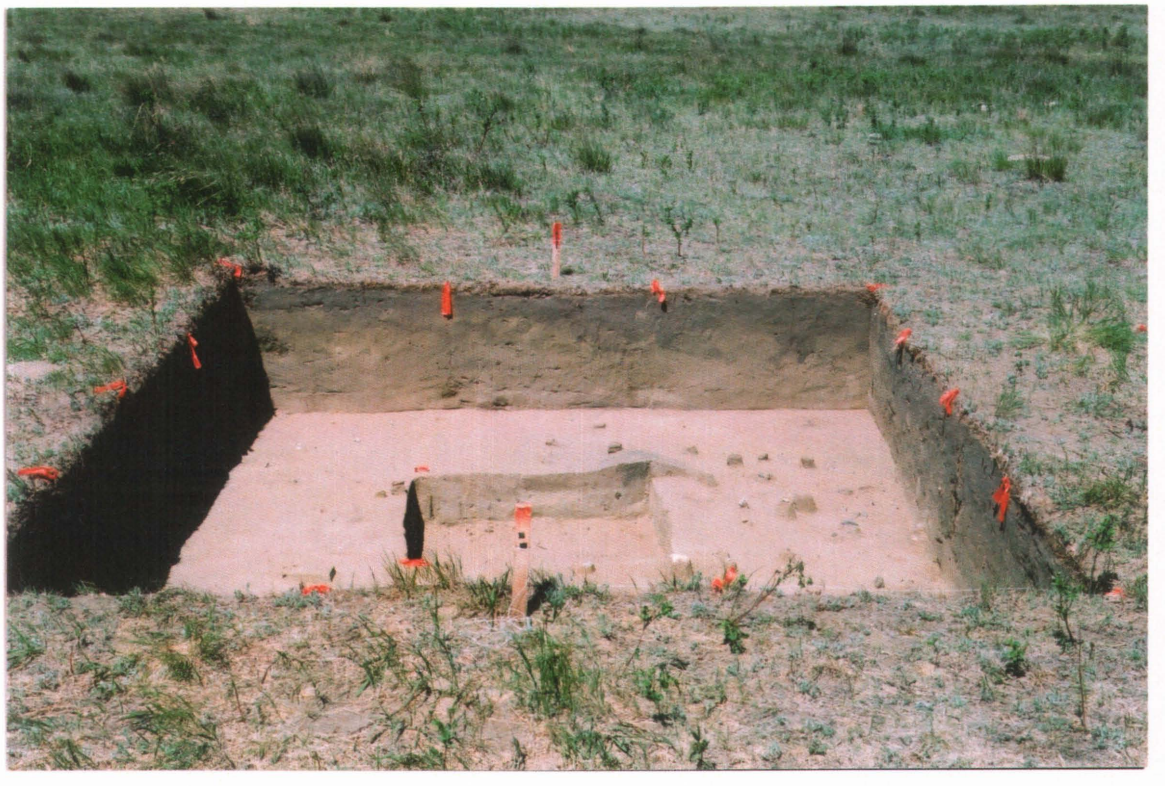


Figure 4.4 Artifact distribution and hearth at base of level 6, Block 1, Occupation 4, Site EgNn 9. View west.

In addition to the basin-shaped hearth, two patches of localized soil discoloration were mapped (Figure 4.5) and samples were also fine screened using one millimeter mesh. The feature identified in level 5 of unit 285N 236E consisted of a 11 centimeter by 13 centimeter patch of soil which displayed a slight difference in

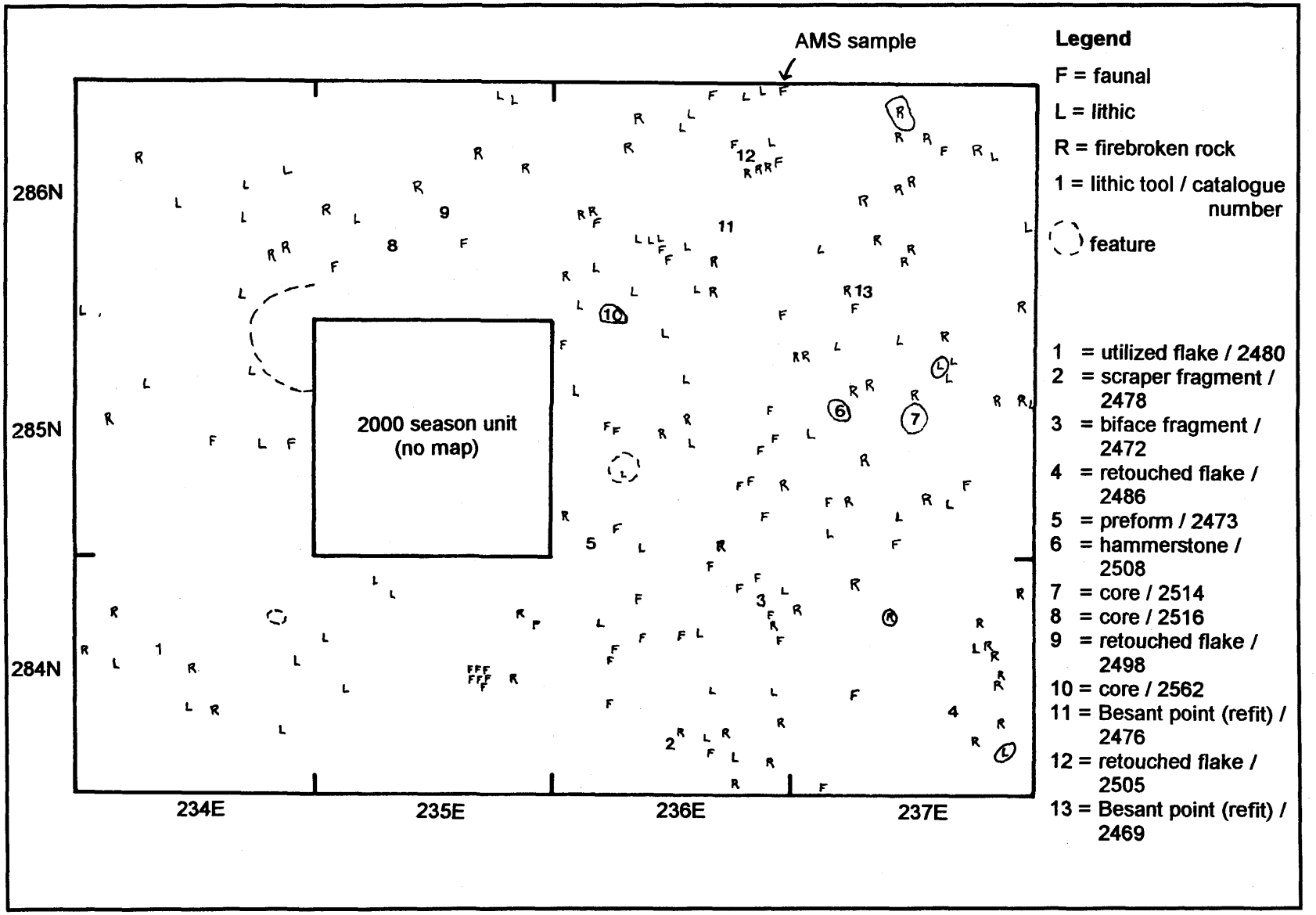


Figure 4.5 Planview of Occupation 4, Block 1, site EgNn 9.

colour and consistency to that of the surrounding matrix. The feature can not be assigned a specific function, however, the fine screened sample did contain faunal material and lithic debitage (discussed below). As such the soil stain in level 5 of unit 285N 236E may represent a cultural feature or may simply be a rodent burrow containing materials associated with the occupation floor as a whole. A second possible feature was identified in level 6 of unit 284N 234E and consisted of a four centimeter by eight centimeter patch of reddened soil. A sample of the matrix was fine screened but did not contain cultural material. The reddening of the soil may be due to natural processes, but the lack of cultural material in the matrix does not preclude the possibility that the feature in level 6 of unit 284N 234E represents the remains of a second hearth associated with the Besant occupation of site EgNn 9.

A total of 951 pieces of faunal material (211.0 gm) were collected from the matrix associated with Occupation 4, including materials recovered from the fine screening of the feature samples. Two faunal specimens could be classified as to element and species / family and include a right fused $2^{nd}/3^{rd}$ tarsal weighing 5.8 grams collected *in situ* from level 6 of unit 286N 235E. While the tarsal could be classified as *Bison bison*, the gender and age of the animal could not be determined. A scapula fragment assigned to the family Bovidae was collected *in situ* from level 6 of unit 286N 236E and although the fragment weighed just 8.0 grams, it was submitted for AMS dating (Beta # 167305, UofS 9-1). A conventional radiocarbon date of 4800 ± 40 years before present (BP) was obtained from bone collagen extracted from the sample by the laboratory of Beta Analytic Inc. The date obtained from the AMS sample is questionable as it is older than dates from other Besant period sites and also due to the fact that an AMS date obtained from level 7 is younger than the level 6 sample. The presence of alkali in the bone collagen may account for the discrepancy in AMS dating of both occupations at site EgNn 9 and as such both AMS dates have been rejected. The rest of the faunal assemblage consists of indeterminate bone and tooth enamel fragments and while some of the remaining faunal specimens were large enough to be mapped *in situ* (Figure 4.5), none retained the landmarks necessary to classify the faunal item as to element or species. A total of 949 indeterminate bone and tooth enamel (197.2 gm) were recovered from Occupation 4 and include 767 unaltered fragments (169.0 gm), 133

burned fragments (16.2 gm) and 49 calcined fragments (12.0 gm). Fine screening of the hearth matrix resulted in the collection of 182 (3.9 gm) of the 767 unaltered indeterminate bone and tooth enamel fragments, 51 (0.7 gm) of the 133 burned fragments, and 14 (0.2 gm) of the 49 calcined fragments. As such, the majority of the indeterminate bone and tooth enamel fragments recovered from Occupation 4 are associated with the occupation floor in general.

Three fragments of snail shell were also recovered from Occupation 4 but appear to represent environmental indicators rather than food sources or decorative objects. A single 0.1 gram fragment from an immature Lymnaeidae shell indicates the presence of long-term standing water near the site while a single 0.1 gram *Planorbidae Promenetus umbilicatellus* shell fragment indicates seasonal standing water within the site vicinity. The final shell fragment (0.1 gm) is too small to identify as to species. The snail shell fragments were recovered from unit 285N 234E, the unit which contained the major portion of the hearth, so the shell may relate to the hauling of water into the campsite for cooking activities associated with the hearth.

Excavation of the Besant occupation of Block 1 produced a total of 314 pieces of firebroken rock weighing 2261.3 grams. The assemblage is dominated by miscellaneous coarse grained material of which 290 fragments (972.5 gm) belong to the 0-5 centimeter size category and four pieces (357.9 gm) belong to the 5-10 centimeter size category. The remaining firebroken rock consists of hard cobble / quartzite fragments including 19 pieces (307.1 gm) belonging to the 0-5 centimeter size class and a single piece (623.8 gm) belonging to the over 10 centimeter size class. Fine screening of sediments from the hearth in level 6 of unit 285N 234E produced just three pieces of miscellaneous coarse grained material firebroken rock (0-5 centimeter sized) weighing 2.5 grams. The hearth sample represents 1.0% of the total firebroken rock assemblage indicating that the feature was not a rock-lined hearth.

A total of eight finished lithic tools (in nine pieces) were recovered during excavation of Occupation 4 of Block 1 at site EgNn 9. Two of the finished tool fragments represent the Besant projectile point which provides the occupation with a

relative date and link the materials recovered from levels 5 and 6. The Besant projectile point is manufactured of silicified wood and a detailed description of the tool (and all tools recovered during excavation) is included in Appendix A. The projectile point tip (Cat.No. 2476) was mapped *in situ* in level 5 at a depth of 67 centimeters below datum while the body of the tool (Cat.No. 2469) was mapped *in situ* in level 6 at a depth of 80 centimeters below datum (Figure 4.5). This disparity in vertical distribution indicates the high level of bioturbation present in Occupation 4 which is at odds with the high degree of preservation represent by the hearth in units 285N 234E and 286N 234E. The remaining finished lithic tools / tool fragments include a biface tip of Knife River flint (Cat.No. 2472) collected from level 6 (Figure 4.5), a biface tip of silicified wood (Cat.No. 2470), and a lateral fragment of a black chert biface (Cat.No. 2474). Two preforms were collected during excavation ; a silicified wood preform (Cat.No. 906) and a tan chert preform (Cat.No. 2473) recovered from level 5 (Figure 4.5). A single scraper fragment (Cat.No. 2478) was found in association with Occupation 4 and the brown chert tool fragment was collected from level 6 (Figure 4.5). The final finished lithic tool collected from Occupation 4 consists of a hammerstone manufactured of quartzite (Cat.No. 2508) which was identified in level 6 (Figure 4.5). The finished tool assemblage is dominated by locally available lithic materials with only the biface tip of Knife River flint representing a trade material.

Ten expediency tools / tool fragments were collected in association with the Besant occupation of Block 1. The expediency tool assemblage is also dominated by locally available materials with only three of the 10 tools (30%) manufactured of Knife River flint, a trade material. A retouched flake manufactured of silicified peat (Cat.No. 2486) and a utilized flake made of red chert (Cat.No. 2480) were collected from level 5 while a retouched flake of silicified peat (Cat.No. 2505) and a retouched flake of a miscellaneous fine grained lithic material (Cat.No. 2498) were recovered in level 6 (Figure 4.5). The remaining expediency tools are associated with the occupation in general and include a retouched flake (Cat.No. 2492), a utilized flake (Cat.No. 2560) and a retouched flake fragment (Cat.No 2504) manufactured of Knife River flint, and single retouched flake fragments of white chalcedony (Cat.No. 2491), silicified peat (Cat.No. 2487), and Swan River chert (Cat.No. 2488).

The lithic assemblage associated with Occupation 4 includes three cores, all collected *in situ* from level 6 (Figure 4.5) and all representing locally available lithic materials. The cobble spall core (Cat.No. 2514) made of quartzite may represent a very early stage preform while the tan chert specimen (Cat.No. 2562) represents a failed core. A multidirectional core of Swan River chert was also recovered from the Besant occupation of Block 1. A single piece of ochre (Cat.No. 2509) was also collected from Occupation 4. The small cone-shaped fragment of gritty orange-brown ochre weighs 3.1 grams and appears to be culturally modified though its exact function can not be identified.

The final category of cultural material recovered from the Besant occupation of Block 1 consists of lithic debitage with a total of 337 pieces of debitage recovered during excavation. All stages of lithic reduction are present in the assemblage including 32 early stage flakes (9.5%), 49 second stage flakes (14.5%), and 88 flake fragments (26.1%). Five of the 88 fragments (5.7% of all flake fragments) were collected from the fine screened hearth matrix. The assemblage is dominated by final stage flakes with a total of 168 flakes recovered representing 49.9% of the total debitage collection. This predominance of final stage flakes is skewed due to the fact that 54 of the 168 flakes (32.1%) were collected during fine screening of the hearth matrix from units 285N 234E and 286N 234E. The final stages of lithic reduction includes the shaping and sharpening of lithic tools which produces tiny finishing flakes generally too small to be recovered using the standard ¼ inch mesh. Fine screening of the matrix from the feature mapped in unit 285N 236E also produced final stage flakes with the two flakes constituting 1.2% of the total final stage flake count. The lithic debitage assemblage is dominated by locally available lithic materials, as is the collection of lithic tools from Occupation 4. The debitage assemblage includes a single piece of Cathead chert and 11 fragments of Knife River flint indicating that trade sources constitute just 3.6% of the total debitage collection (Table 4.2).

The Besant phase occupation of site EgNn 9 identified during the excavation of Block 1 exhibits an array of typical campsite activities. A well defined, basin-shaped hearth was revealed in the northwest section of the excavation block and while the floor plan illustrates most of the large items recovered during excavation, the

Table 4.2 : Lithic material types represented by debitage recovered from Occupations 4 and 5 ; Block 1, site EgNn 9, Permit 01- 45.

MATERIAL TYPE	OCCUPATION 4		OCCUPATION 5	
	count	%	count	%
arenaceous chert	2	0.6	0	0
chalcedony	39	11.6	17	12.3
chert	39	11.6	19	13.8
feldspathic siltstone	1	0.3	0	0
miscellaneous coarse	3	0.9	6	4.4
miscellaneous fine	2	0.6	4	2.9
quartz	2	0.6	2	1.5
quartzite	39	11.6	16	11.6
quartzose	2	0.6	1	0.7
silicified peat	11	3.3	1	0.7
silicified siltstone	3	0.9	1	0.7
silicified wood	28	8.3	8	5.8
Cathead chert	1	0.3	0	0
Knife River flint	11	3.3	1	0.7
Swan River chert	154	45.7	62	44.9
total	337	100.2	138	100

level records from the 2000 season are not available so the floor plan is incomplete (Figure 4.5). The floor plan and distribution maps of the cultural materials recovered during excavation (Figure 4.6) reveal a relatively dense scattering of materials across the entire block with a slightly higher concentration of materials in the eastern ¾ of the block. The identification of a hearth and the recovery of firebroken rock and faunal material, including calcined and burned fragments, indicate that the inhabitants of the site were processing game for food. The identification of debitage from all stages of lithic reduction, as well as the recovery of cores and lithic tools and tool fragments, indicates that the manufacture and repair of lithic tools was also conducted on-site. The distribution of the lithic assemblage does not reveal a specific lithic workshop as debitage was found in all of the units and, more notably, only two of the 12 units did not contain a lithic tool or tool fragment. The distribution of cores across the excavation block would suggest that early stage reduction occurred along the northeastern section of the block while the high concentration of final stage debitage

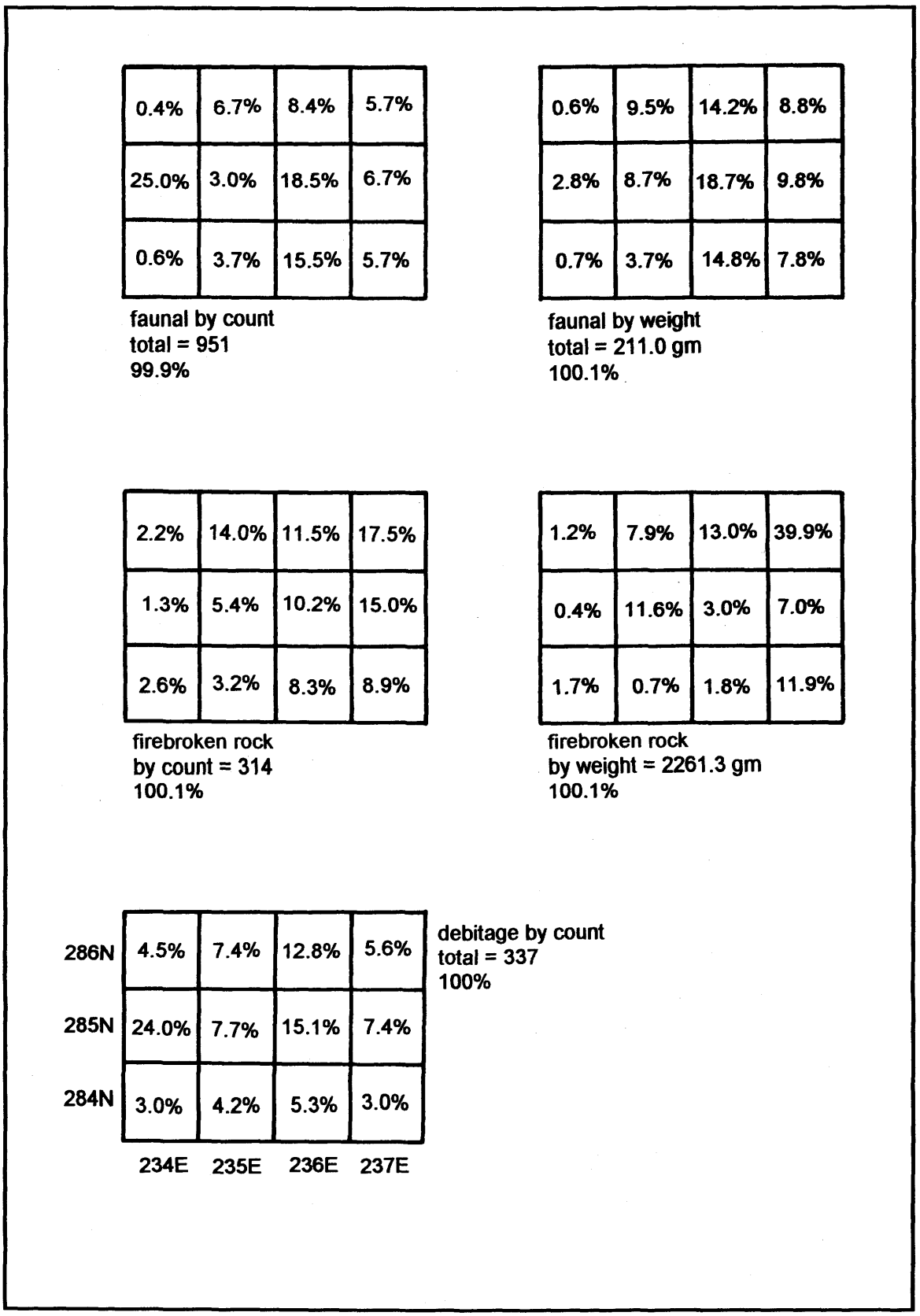


Figure 4.6 Artifact distribution maps, Occupation 4, Block 1, site EgNn 9.

identified in the fine screened matrix of the hearth suggests that final shaping and sharpening of the tools occurred near the hearth. However, the high recovery rate of final stage flakes from the unit containing the majority of the hearth is skewed due to the fact that only samples from the hearth (and the other two possible features) were fine screened. Final stage flakes may have been equally distributed across the entire block but due to the small size of the debitage associated with this stage of reduction, only fine screening of sediments allowed for the recovery of the artifacts. The artifact recovery rate for the lithic assemblage has been noticeably increased by the fine screening of the hearth matrix. Twenty-four percent of the total debitage assemblage was collected from unit 285N 234E with 17.5% collected from the hearth itself. Likewise, the faunal distribution generally follows that shown on the floor plan except that the units containing the hearth revealed a much higher faunal count than that shown on the floor plan. Twenty-five percent of the total faunal count was recovered from unit 285N 234E with 24.4% of that count represented by fine screened samples from the hearth in the unit. When faunal distribution by weight is analyzed, however, the predominance of faunal materials from the unit containing the hearth is negated. Only 2.8% of the total faunal assemblage by weight is present in the unit 285N 234E (Figure 4.6). Regardless of the slight change in artifact distribution patterning produced by fine screening of the sediments, Occupation 4 of Block 1 displays the typical array of cultural materials attributed to precontact campsite activities. While there is evidence of the mixing of the sediments associated with the Besant phase utilization of site EgNn 9 (due to natural processes such as bioturbation and the migration of sand dunes) the presence of a relatively intact hearth suggests that artifact distribution across the excavation block still reflects the location of human activities conducted at the site.

4.2.5 Block 1, Occupation 5

The fifth of the eight cultural occupations of site EgNn 9 revealed during excavation of Block 1 consists of the materials collected from arbitrary level 7 and dates to the Pelican Lake phase. The relative date for site utilization has been assigned based on the recovery of two Pelican Lake projectile points from two of the 12 excavation units which comprise Block 1. Occupation 5 is associated with a discontinuous paleosol identified near the base of level 7 which is visible in the wall

profiles of the excavation block (Figure 4.3). The west wall profile shows the paleosol in a gentle downward slope to the north which indicates that the ground surface present at the time of occupation was also gently undulating. The wall profiles also indicate the presence of rodent burrows throughout the brown sand matrix above the paleosol suggesting some mixing of materials associated with the brown sand layer present in both Occupation 4 and Occupation 5. The recovery of a piece of lithic debitage from the paleosol in the west wall indicates that the paleosol is associated with human utilization of the site.

During the excavation of unit 286N 235E a possible feature was mapped (Figure 4.7) and its matrix was collected for fine screening. The 10 centimeter by 25 centimeter area displayed soil of a slightly different consistency and colour to the surrounding matrix. This possible feature was only one centimeter thick and did not contain ash, charcoal, or firebroken rock which would indicate a hearth or boiling pit. Fine screening of the matrix resulted in the recovery of 37 faunal fragments and seven final stage flakes which are discussed below in conjunction with the rest of the cultural material inventory from Occupation 5. The low concentration of artifacts exhibited by the localized soil stain suggests that the possible feature simply represents the remains of a rodent burrow containing artifacts associated with the occupation floor in general.

The Pelican Lake occupation of site EgNn 9 displays a relatively light scattering of artifacts typical of precontact period campsite activities. A total of 305 pieces of faunal material weighing 94.3 grams were collected during excavation of Block 1. Two faunal specimens were complete enough to identify as to basic element and include a single indeterminate long bone / limb element fragment classified as *Bison bison*. The limb element fragment could not be identified as to gender or age of the animal, and was mapped *in situ* in unit 284N 235E (Figure 4.7). While this faunal specimen weighed only 2.6 grams it appeared unweathered and dense enough to be submitted for AMS dating (Beta # 167306 , UofS 9-2). Bone collagen was extracted from the sample and produced a date of 4520 $\pm$ 50 years BP, a date younger than that obtained from the AMS-dated sample from Occupation 4. The presence of alkali in the bone collagen samples may account for the discrepancy and subsequent

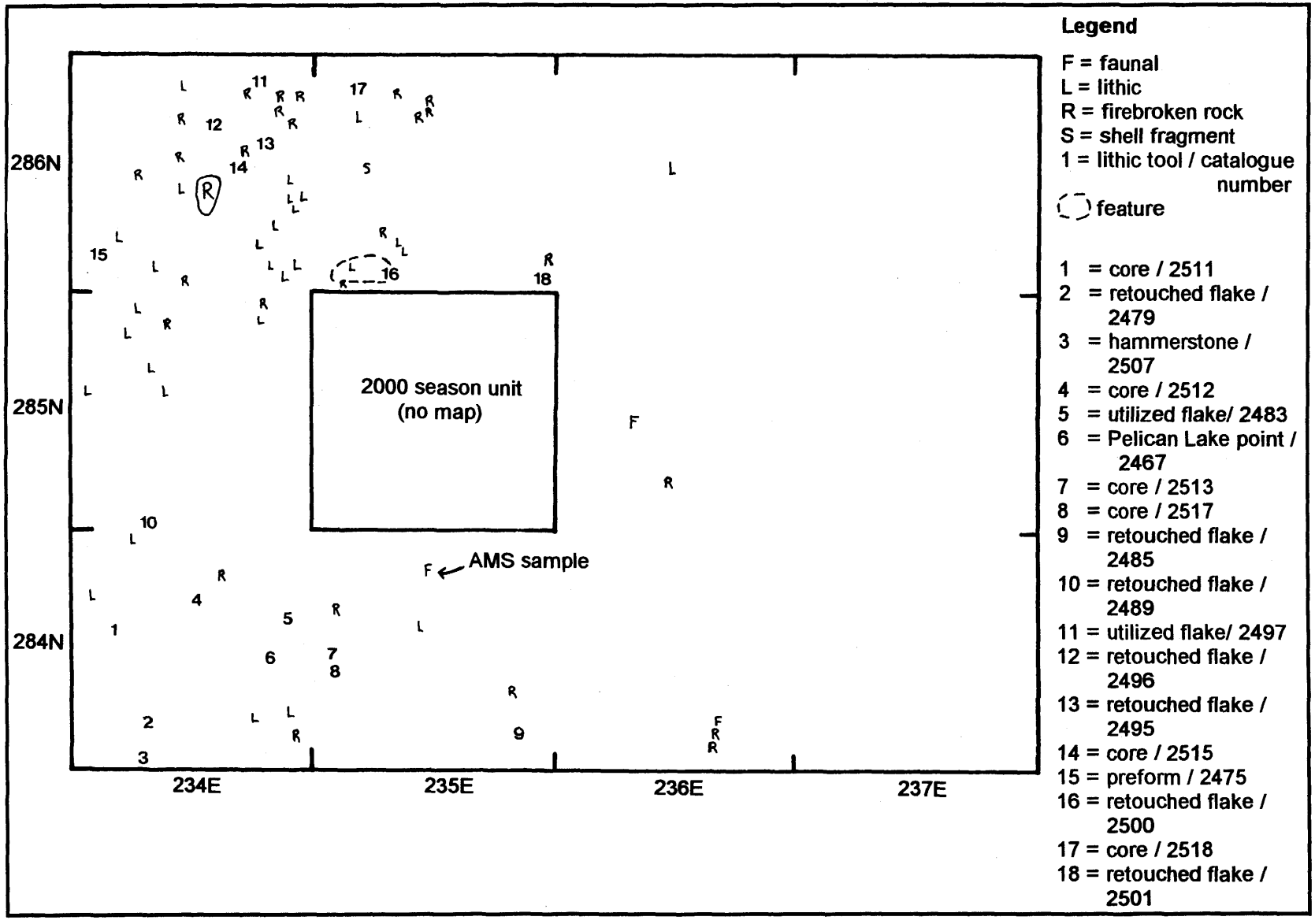


Figure 4.7 Planview of Occupation 5, Block 1, site EgNn 9.

rejection of the radiometric dates. A second indeterminate long bone / limb element fragment (4.1 gm) was recovered from Occupation 5 but was too weathered to identify as to species or gender / age of animal. The remainder of the faunal assemblage associated with the Pelican Lake occupation of Block 1 consists of indeterminate bone and tooth enamel fragments. A total of 261 unaltered fragments (81.3 gm), 23 burned fragments (3.0 gm), and 19 calcined (3.3 gm) indeterminate bone and tooth enamel fragments were collected from Occupation 5. Fine screening of the matrix from the possible feature resulted in the collection of 32 of the 261 unaltered bone and tooth enamel fragments and five of the 23 burned fragments which constitutes 12.1% of the total faunal assemblage by count, and just 1.0% by weight. Therefore fine screening increased artifact recovery rates for the occupation as a whole yet the results did not provide additional information regarding utilization of the site. Excavation of Occupation 5 also resulted in the recovery of a single snail shell fragment (Figure 4.6) classified as a *Pelecypoda unionidae* shell fragment. The shell fragment (0.1 gm) appears to be an environmental indicator providing evidence of standing water in the immediate site vicinity rather that being a food source or decorative item.

A total of 130 pieces of firebroken rock (1596.7 gm) were collected during excavation of Occupation 5 and includes a single piece of hard cobble / quartzite firebroken rock belonging to the 5-10 centimeter size category (47.5 gm). The rest of the firebroken rock assemblage consists of miscellaneous coarse grained materials and includes 125 fragments (441.0 gm) from the 0-5 centimeter size category, two fragments (235.9 gm) from the 5-10 centimeter size category, and two fragments (872.3 gm) over 10 centimeters in size. Most of the large fragments of firebroken rock were mapped (Figure 4.7) and their depths place them in the brown sand layer directly above the paleosol (84 to 86 cm BD). Firebroken rock represents a relatively high percentage of the total cultural assemblage for the occupation as a whole and suggests the presence of a hearth or boiling pit in association with the occupation.

The lithic assemblage associated with the Pelican Lake occupation of Block 1 includes five finished lithic tools / tool fragments. A broken Pelican Lake projectile point manufactured of silicified wood (Cat.No. 932) was recovered from the 2000

season excavation unit while a second broken Pelican Lake projectile point made of Knife River flint (Cat.No. 2467) was collected *in situ* during the 2001 season (Figure 4.7). A preform fragment of feldspathic siltstone (Cat.No. 2475) and a silicified siltstone pebble showing use as a hammerstone (Cat.No. 2507) were also recovered *in situ*. The final finished lithic tool fragment collected from Occupation 5 consists of a biface tip fragment manufactured of Swan River chert (Cat.No. 2471). The tool assemblage is dominated by locally available lithic material with Knife River flint representing a trade material.

Thirteen expediency tools / tool fragments representing 12 tools were collected from Occupation 5 of Block 1. The expediency tool assemblage is also dominated by locally available lithic materials with arenaceous chert and Montana chert being the only possible trade materials represented. Seven flakes demonstrated patterned retouch along at least one edge indicating their use as expediency tools and include two tools manufactured of Swan River chert (Cat.No. 2485 and 2494), and single tools of arenaceous chert (Cat.No. 2482), Montana chert (Cat.No. 2495), yellow quartzite (Cat.No. 2489), purple quartzite (Cat.No. 2501) and silicified peat (Cat.No. 2496). Retouched flake fragments were also recovered including a grey chert fragment (Cat.No. 2479), a Swan River chert fragment (Cat.No. 2493), and two Swan River chert fragments which refit to form a single tool (Cat.No. 2499 and 2500). The remaining expediency tools collected from Occupation 5 consist of a utilized flake of grey quartzite (Cat.No. 2483) and a utilized flake fragment of Swan River chert (Cat.No. 2497).

Excavation of Block 1 also resulted in the recovery of six cores found in seven pieces across the eastern half of the block. Two multidirectional cores of Swan River chert (Cat.No. 2512 and 2515) and two exhausted bipolar cores, one of silicified wood (Cat.No. 2510) and one of Swan River chert (Cat.No. 2511), were collected from the occupation floor. A single core fragment of yellow quartzite (Cat.No. 2513) was also found in association with the Pelican Lake phase utilization of site EgNn 9. The remaining core fragments refit to form a single bipolar core of silicified wood. One fragment (Cat.No. 2517) was found *in situ* in unit 284N 235E while the second (Cat.No. 2518) was found *in situ* in unit 286N 235E (Figure 4.7). While the broken

projectile points have provided a relative date for the occupation, the refit core fragments provide evidence that the Pelican Lake occupation was relatively intact regardless of the gaps in artifact distribution and evidence of rodent burrows.

Lithic debitage found in association with the Pelican Lake occupation of Block 1 consists of a total of 138 pieces representing all stages of lithic reduction. Early stage reduction is represented by 29 pieces (21.0%), second stage by 17 pieces (12.3%) and final stage by 44 pieces (31.9%), with the rest of the assemblage consisting of 48 flake fragments / shatter (34.8%). The debitage assemblage is dominated by locally available materials with only 1% of the assemblage consisting of a possible trade material, Knife River flint (Table 4.2). Seven of the 44 final reduction stage flakes (15.9%) were recovered during fine screening of the matrix from the possible feature mapped in unit 286N 235E.

The floor plan of Occupation 5 (Figure 4.7) shows a heavier scattering of cultural materials along the western half of the excavation block with a notable gap created by the lack of *in situ* information from the 2000 season. The floor plan does not reveal any specific activity areas although most of the large fragments of firebroken rock are present in the extreme northwest corner of the block. As well, distribution maps indicate that 33.1 % by count and 73.9% by weight of the total firebroken assemblage was recovered from the extreme northwestern unit of Block 1 (Figure 4.8). Artifact distribution maps also indicate that the majority of the cultural materials from the Pelican Lake occupation are associated with the western half of Block 1 (Figure 4.8). All of the lithic tools and tool fragments (finished and expediency) were recovered from the six units which form the western half of the block. Faunal materials were collected from all of the excavation units while only two units did not contain firebroken rock. Lithic debitage and cores were recovered from eight of the 12 excavation units however when the percentages of materials collected are examined a much more focused distribution pattern is indicated. A total of 85.2% of the faunal assemblage by count (84.5% by weight), 88.5% of the firebroken rock assemblage by count (98.65 by weight), and 97.8% of the debitage assemblage were collected from the western half of the excavation block (Figure 4.8) suggesting that intact Pelican Lake phase materials are still present in the unexcavated areas to the west of the block.

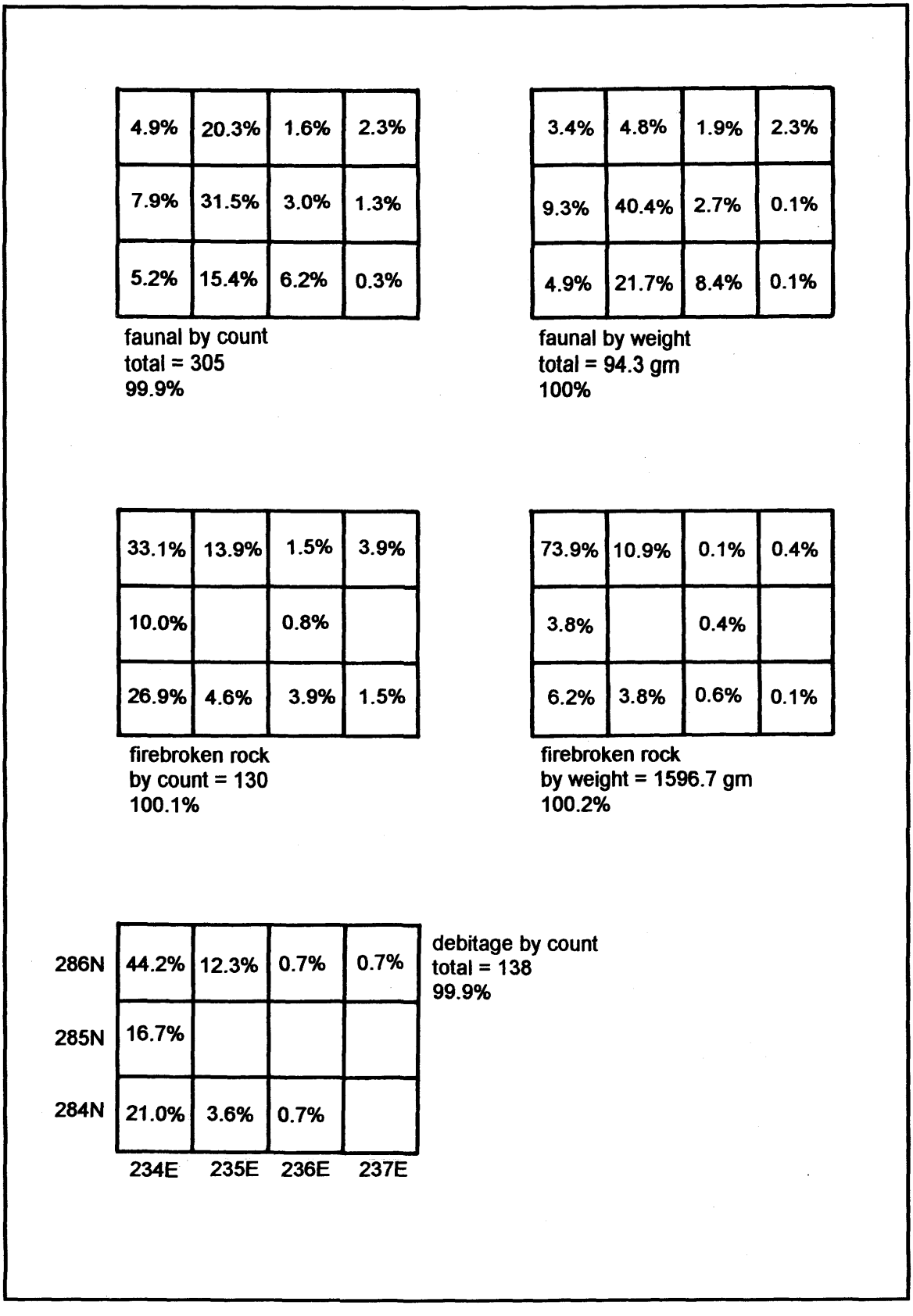


Figure 4.8 Artifact distribution maps, Occupation 5, Block 1, site EgNn 9.

4.2.6 Block 1, Occupation 6

The sixth occupation of site EgNn 9, as represented by the materials collected from Block 1, consists of a very light scattering of artifacts from arbitrary level 8. Occupation 6 is associated with a layer of light brown / tan sand which shows evidence of rodent burrows throughout the matrix (Figure 4.3). A marked change of colour and texture is visible in the profiles of the excavation block at a depth consistent with the top to middle of level 8. This change in matrix may be associated with a period of major environmental changes, such as the deflation and re-stabilization of the sand dune landscape of site EgNn 9.

Occupation 6 consists of a very light scattering of cultural materials recovered from all but one of the 12 units from Block 1 (unit 286N 236E was sterile). A total of three faunal specimens were collected and include two indeterminate bone fragments together weighing 0.7 grams. The third faunal item, an indeterminate bone fragment weighing 1.2 grams, was submitted for AMS dating in an attempt to clarify the time period of occupation represented by the materials in level 8. The sample (UofS 9-3) proved too fragmentary and weathered to be dated.

The remainder of the cultural material assemblage found in association with Occupation 6 consists of lithic artifacts. Two fragments of firebroken rock were collected from level 8. The miscellaneous coarse grained material fragments belong to the 0-5 centimeter size category and weigh a total of 0.7 grams. A single expediency tool consisting of a Swan River chert flake fragment showing patterned retouch (Cat.No. 2481) was also collected from Occupation 6. A total of eight pieces of debitage representing all stages of lithic reduction were recovered. The debitage assemblage includes three early stage flakes (37.5%), two second stage flakes (25.0%), two final stage flakes (25.0%), and a single flake fragment (12.5%). The assemblage is dominated by locally available materials with a single piece of Knife River flint representing a possible trade material (Table 4.3). The final lithic artifact associated with Occupation 6 consists of a reworked projectile point manufactured of brown chalcedony (Cat.No. 2468). Classification of the projectile point is problematic due to the degree of reshaping that was conducted on the point in an attempt to reuse the projectile. The projectile point shows a major impact fracture which has resulted in

asymmetric refinishing of the body of the tool. The base of the projectile point shows traits associated with both Sandy Creek phase points and Oxbow phase points, however, reworking of the tool has obscured most of the features necessary for definitive classification. Due to the fact that the projectile point is associated with an occupation beneath a Pelican Lake phase occupation would suggest that the tool, and Occupation 6, represents utilization of the site during the Oxbow phase.

Table 4.3 : Lithic material types represented by debitage recovered from Occupations 6, 7, and 8 ; Block 1, site EgNn 9, Permit 01- 45.

MATERIAL TYPE	OCCUPATION 6		OCCUPATION 7		OCCUPATION 8	
	count	%	count	%	count	%
chalcedony	0	0	0	0	0	0
chert	1	12.5	0	0	0	0
feldspathic siltstone	1	12.5	0	0	0	0
miscellaneous coarse	0	0	1	33.3	0	0
miscellaneous fine	1	12.5	0	0	0	0
quartz	0	0	0	0	0	0
quartzite	1	12.5	0	0	1	20.0
quartzose	0	0	0	0	0	0
silicified peat	0	0	0	0	0	0
silicified siltstone	0	0	0	0	0	0
silicified wood	1	12.5	0	0	1	20.0
Knife River flint	1	12.5	0	0	0	0
Swan River chert	2	25.0	2	66.7	3	60.0
total	8	100	3	100	5	100

4.2.7 Block 1, Occupation 7

The seventh occupation of site EgNn 9 is associated with the sparse scattering of artifacts recovered from arbitrary level 9. A small section of paleosol associated with the base of level 9 is visible in the profile of the excavation block's south wall, however, most of the occupation appears to be associated with the light brown / tan sand layer which extends from level 8 down to the base of the excavation block (Figure 4.3).

Cultural material was recovered from seven of the 12 units which comprise Block 1 with no discernible distribution patterns evident. The faunal assemblage consists of 10 indeterminate bone and tooth enamel fragments weighing a total of 2.3 grams. The indeterminate bone fragments include a single calcined fragment (0.2 gm), two burned fragments (0.6 gm), and seven unaltered fragments (1.5 gm). A single fragment of firebroken rock was collected during excavation of Occupation 7. The miscellaneous coarse grained material fragment belongs to the 0-5 centimeter size category and weighs 1.2 grams. The only lithic tool found in association with Occupation 7 consists of a retouched flake manufactured of grey quartzite (Cat.No. 2484). The lithic debitage assemblage includes a single early reduction stage flake (33.3%), a single second stage flake (33.3%), and a single final stage flake (33.3%). All lithic debitage (Table 4.3), as well as the single expediency tool, are manufactured of locally available materials. No date can be assigned to the period of site utilization represented by Occupation 7.

4.2.8 Block 1, Occupation 8

The final occupation of Block 1 at site EgNn 9 includes the materials collected from arbitrary level 10. Occupation 8 is associated with the basal light brown / tan sand layer as seen in the excavation block profiles (Figure 4.3). Cultural material was lightly scattered across eight of the 12 excavation units of Block 1. Faunal material includes 16 indeterminate bone and tooth enamel fragments weighing a total of 5.3 grams. The indeterminate fragments consist of four calcined fragments (1.1 gm), seven burned fragments (2.6 gm), and five unaltered fragments (1.6 gm).

The lithic assemblage recovered from Occupation 8 includes a single finished lithic tool. The spokeshave is manufactured of grey quartzite (Cat.No. 2477) and while it provides evidence of campsite activities, the finished tool can not provide a relative date for the occupation. The lithic tool and the debitage collected from the occupation represent locally available materials (Table 4.3). The debitage collected from Occupation 8 includes two final reduction stage flakes (40%) and three flake fragments / shatter (60%). The sparse cultural assemblage recovered from Occupation 8 indicates that site EgNn 9 was utilized for precontact campsite activities however the time period of utilization can not be determined.

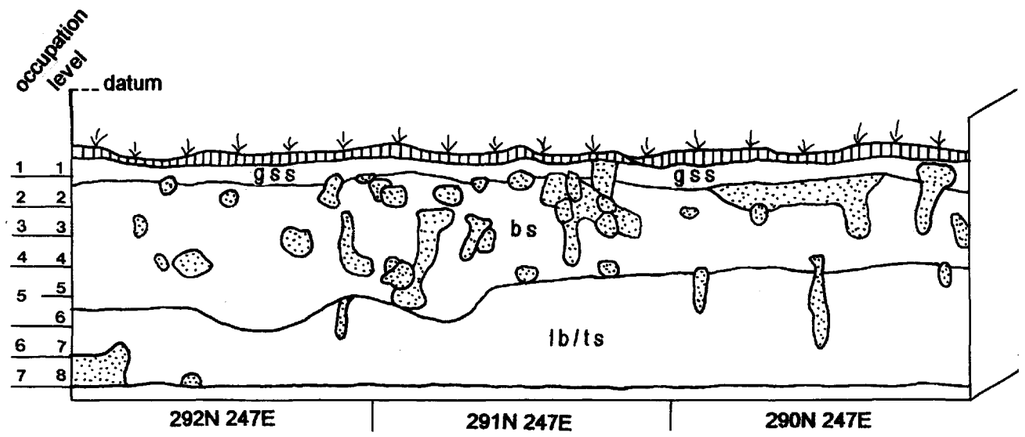
4.3 Excavation Block 2

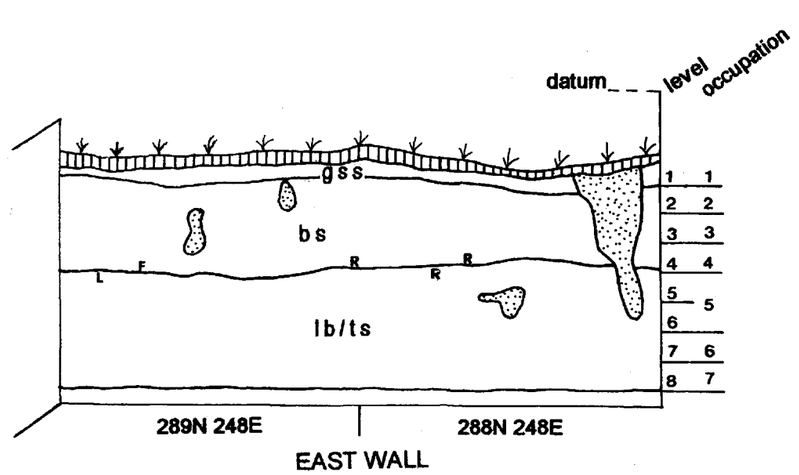
Seven possible occupations of site EgNn 9 (plus one mixed occupation, Occupation 5A) were identified during excavation of the fourteen units which comprise Block 2. Most of the excavation block was excavated to a depth of 80 centimeters below ground surface or 100 centimeters below datum. In 2001, an additional 10 centimeter level was completed in the 2000 season unit (291N 246E) bringing the unit to a depth of 80 centimeters below surface. Due to time constraints a single unit, 288N 245E, was excavated to a total depth of 60 centimeters below surface. The two lower occupations in the single unit were sacrificed in order to maximize horizontal exposure of the more densely populated upper occupations. Unlike Block 1, Block 2 contained neither diagnostic artifacts nor paleosols.

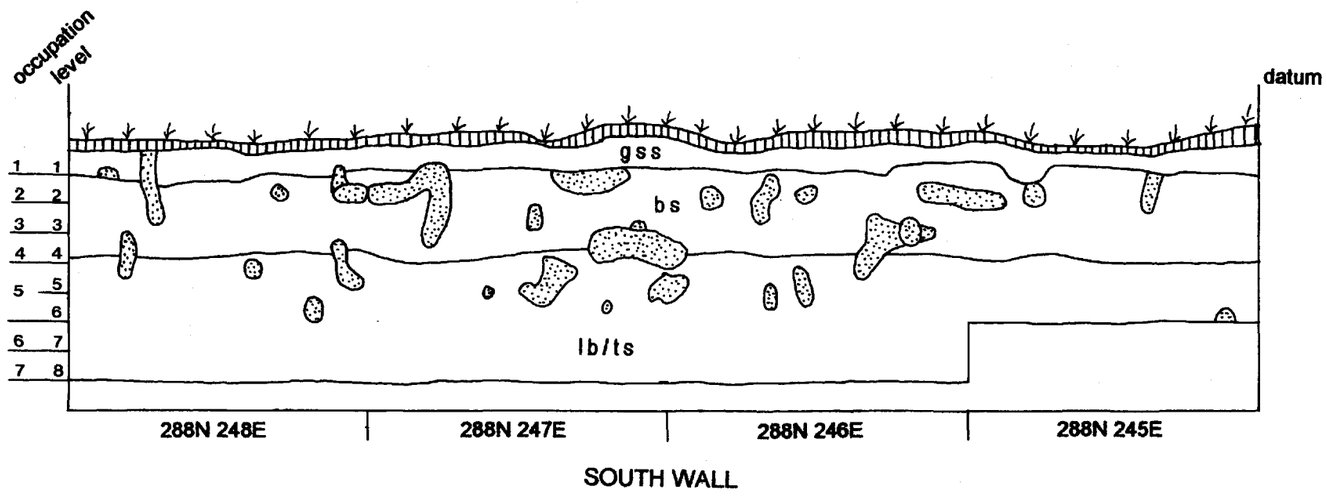
4.3.1 Block 2, Occupation 1

The uppermost occupation of site EgNn 9 as seen during excavation of Block 2 is represented by the materials recovered from arbitrary level 1. Occupation 1 is associated with the sod layer and the thin grey silt sand layer directly below the sod (Figure 4.9) and as such may represent a mixed occupation. The sparse scatter of cultural material was recovered from 12 of the 14 excavation units which form Block 2 with units 290N 246E and 292N 247E proving sterile of cultural materials. Occupation 1 contains 15 faunal specimens weighing a total of 6.7 grams. The faunal assemblage consists of 13 unaltered indeterminate bone and tooth enamel fragment weighing 6.3 grams and two burned indeterminate bone and tooth enamel fragments weighing 0.4 grams. Excavation of Occupation 1 also resulted in the recovery of 34 fragments of firebroken rock weighing a total of 74.6 grams. The firebroken rock consists of locally available miscellaneous coarse grained lithic material fragmented into 0-5 centimeter-sized pieces. The presence of firebroken rock and burned faunal remains suggests the existence of a hearth in association with the uppermost occupation.

A single finished lithic tool was found in association with Occupation 1. A failed preform (Cat.No. 2520) manufactured of yellow chert was collected during excavation in the 2001 season. The remainder of the lithic assemblage consists of 17







Legend

sod

rodent burrow

g s s = grey sandy silt

b s = brown sand

l b / t s = light brown / tan sand

F = faunal item

L = lithic artifact

R = firebroken rock

Scale

0 cm 50

Figure 4.9 Profiles of east and south walls, Block 2, site EgNn 9.

pieces of debitage including five second reduction stage flakes (29.4%), six final stage flakes (35.3%), and six flake fragments / shatter (35.3%). The debitage assemblage, including the single finished tool, is manufactured of locally available materials (Table 4.4).

Table 4.4 : Lithic material types represented by debitage recovered from Occupations 1, 2, and 3 ; Block 2, site EgNn 9, Permit 01- 45.

MATERIAL TYPE	OCCUPATION 1		OCCUPATION 2		OCCUPATION 3	
	count	%	count	%	count	%
argillite	0	0	1	7.7	0	0
chalcedony	0	0	0	0	4	14.8
chert	1	5.9	0	0	3	11.1
miscellaneous coarse	1	5.9	1	7.7	0	0
miscellaneous fine	0	0	0	0	1	3.7
quartz	0	0	0	0	1	3.7
quartzite	3	17.7	3	23.1	6	22.2
silicified peat	1	5.9	0	0	0	0
silicified wood	5	29.4	4	30.8	6	22.2
Swan River chert	6	35.3	4	30.8	6	22.2
total	17	100.1	13	100.1	27	99.9

4.3.2 Block 2, Occupation 2

The second occupation identified during excavation of Block 2 consists of the materials recovered from arbitrary level 2 and is associated with the uppermost portion of the brown sand layer seen in the profiles of the excavation block (Figure 4.9). The profiles also indicate that the second occupation may be mixed as level 2 partially intersects with the upper grey silt sand layer and displays numerous rodent burrows. Occupation 2 contains a light scatter of cultural materials recovered from 13 of the 14 units which comprise Block 2 (unit 291N 246E proved sterile) and includes 14 unaltered indeterminate bone and tooth enamel fragments (4.7 gm) and five burned indeterminate bone and tooth enamel fragments (0.9 gm). The cultural assemblage is dominated by firebroken rock with a total of 50 pieces weighing 187.4 grams collected during excavation. The firebroken rock collection includes a single fragment of hard cobble / quartzite belonging to the 0-5 centimeter size category (0.8 gm) with the rest of the collection comprised of miscellaneous coarse grained material

fragments including a single 5-10 centimeter sized fragment (39.6 gm) and 48 0-5 centimeter sized fragments (147.0 gm). The recovery of burned faunal material and firebroken rock suggests the presence of a hearth in association with the occupation.

The lithic assemblage associated with Occupation 2 consists of 13 pieces of debitage with all stages of lithic reduction represented. The debitage assemblage consists of a single early stage flake (7.7%), six second stage flakes (46.2%), five final stage flakes (38.5%), and a single flake fragment / shatter (7.7%). Locally available materials dominate the lithic assemblage with a single piece of debitage representing a trade material (argillite) (Table 4.4).

4.3.3 Block 2, Occupation 3

The third occupation of site EgNn 9 as identified during excavation of Block 2 includes the materials collected from arbitrary level 3. Occupation 3 is associated with the brown sand layer containing numerous rodent burrows (Figure 4.9) and consists of a light scattering of artifacts recovered from all but one of the excavation units (292N 246E proved sterile). The faunal assemblage consists of a total of 41 fragments including 27 unaltered indeterminate bone and tooth enamel fragments (11.8 gm), three calcined indeterminate bone and tooth enamel fragments (0.3 gm), and 11 burned indeterminate bone and tooth enamel fragments (3.8 gm). Occupation 3 contains a high percentage of firebroken rock with a total of 87 0-5 centimeter sized fragments weighing 246.2 grams recovered. The firebroken rock assemblage includes two hard cobble / quartzite fragments weighing 2.9 grams and 85 miscellaneous coarse grained material fragments weighing 243.3 grams. While a clearly identified feature was not identified, the recovery of firebroken rock and burned and calcined bone fragments suggests the presence of a hearth.

The lithic assemblage associated with Occupation 3 includes an end-and-side scraper manufactured of feldspathic siltstone (Cat.No. 2523) recovered *in situ* from unit 289N 248E. A single expediency tool was also collected, a retouched flake fragment of Swan River chert (Cat.No. 2540). The remainder of the lithic assemblage consists of 27 pieces of debitage representing all stages of reduction. Five early stage flakes (18.5%), eight second stage flakes (29.6%), seven final stage flakes

(25.9%), and seven flake fragments / shatter (25.9%) were collected from Occupation 3. The lithic assemblage is comprised of locally available materials (Table 4.4), including those used to manufacture the lithic tools.

4.3.4 Block 2, Occupation 4

A dense scatter of cultural materials across the entire excavation block represents the fourth possible occupation of site EgNn 9 as identified in Block 2. Occupation 4 is associated with the base of the brown sand layer to the contact point with the lower light brown / tan sand layer (Figure 4.9). The brown sand layer displays numerous rodent burrows so it is likely that some degree of disturbance has impacted the cultural material collected in arbitrary level 4. The faunal assemblage consists of a total of 323 specimens including a single identifiable item, a weathered right ulnar carpal identified as *Bison bison* (7.0 gm). The remainder of the faunal collection consists of 241 unaltered indeterminate bone and tooth enamel fragments (92.9 gm), 23 calcined indeterminate bone and tooth enamel fragments (5.6 gm), and 58 burned indeterminate bone and tooth enamel fragments (11.8 gm). Excavation also resulted in the recovery of five fragments from an unidentifiable egg shell (0.1 gm). The egg shell may represent a precontact food source, however, given the highly fragile nature of the shell, the fragments may represent more recent intrusive debris associated with the numerous rodent burrows evident during excavation.

Excavation of Occupation 4 resulted in the recovery of a high density of firebroken rock, a total of 427 pieces weighing 2752.4 grams. The majority of the firebroken rock consists of miscellaneous coarse grained material fragments with 14 pieces belonging to the 5-10 centimeter size category (1347.0 gm) and 404 pieces belonging to the 0-5 centimeter size category (1303.2 gm). The remainder of the firebroken rock assemblage is manufactured of hard cobble / quartzite with a single fragment belonging to the 5-10 centimeter size category (26.3 gm) and eight fragments belonging to the 0-5 centimeter size category (75.9 gm). Distribution of the firebroken rock across the excavation block shows a heavier concentration along the southern portion of the block, a pattern reflected by the other categories of cultural material (Figure 4.10). Excavation did not identify distinct cultural features such as

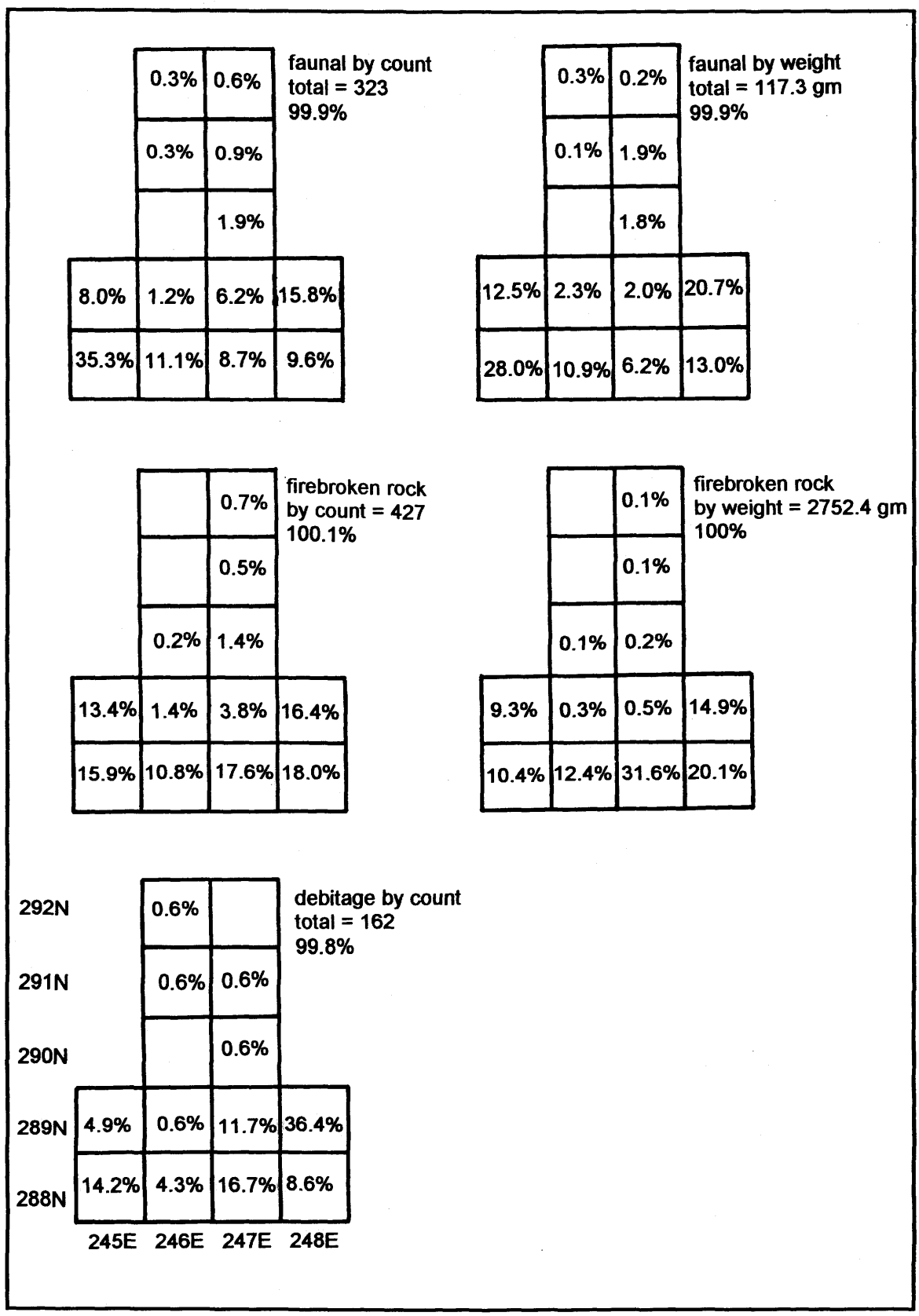


Figure 4.10 Artifact distribution maps, Occupation 4, Block 2, site EgNn 9.

boiling pits or hearths, however, the density of firebroken rock and the presence of calcined and burned bone suggests precontact processing of game resources.

The lithic assemblage associated with Occupation 4 includes four finished tools and four expediency tools. An end-and-side scraper manufactured of Swan River chert (Cat.No. 2526) and two scraper fragments (white chert, Cat.No. 2524 and Swan River chert, Cat.No. 2525) were recovered *in situ* from a single unit, unit 289N 248E. The final finished tool, also a scraping tool, was collected *in situ* from unit 288N 245E and consists of an endscraper of yellow chert (Cat.No. 2522). The expediency tools include a retouched flake of Swan River (Cat.No. 2538) collected from unit 289N 248E. Two retouched flake fragments were collected *in situ*, both are manufactured of Swan River chert, with one recovered in unit 289N 248E and the other in unit 291N 247E. The remaining expediency tool consists of a retouched flake fragment of Knife River flint recovered from unit 288N 247E. The tool assemblage suggests that hide processing was conducted on site.

Excavation of Occupation 4 also resulted in the recovery of two cores and 162 pieces of lithic debitage. Both cores are unidirectional cores manufactured of yellow quartzite and were recovered from unit 288N 247E (Cat.No. 2553) and unit 289N 248E (Cat.No. 2554). The lithic debitage collected from Occupation 4 represents all stages of reduction and include 27 early stage flakes (16.7%), 19 second stage flakes (11.7%), 61 final stage flakes (37.7%), and 55 flake fragments / shatter (34.0%). The recovery of six of the eight tools, both of the cores, and 73.4% of the debitage from the southeast corner of the excavation block indicates that the four units represent a lithic workshop area (Figure 4.10). However, the four units which form the southeast corner of the excavation block also contained relatively high percentages of the faunal assemblage and the firebroken rock collection associated with the occupation as a whole. Distribution patterns of all the cultural materials recovered from Occupation 4 (Figure 4.10) reveal that the majority of the artifacts were collected from the southern portion of the excavation block. An area of deflation identified in Occupation 5 suggests that the distribution patterns revealed in Occupation 4 may be incomplete. The lithic assemblage of Occupation 4 is dominated by locally available materials (Table 4.5) with Knife River flint being the only trade material recovered. Three pieces

of debitage and a single retouched flake are manufactured of Knife River flint, representing a small percentage of the total lithic collection from Occupation 4.

Table 4.5 : Lithic material types represented by debitage recovered from Occupations 4, 5, and 5A ; Block 2, site EgNn 9, Permit 01- 45.

MATERIAL TYPE	OCCUPATION 4		OCCUPATION 5		OCCUPATION 5A	
	count	%	count	%	count	%
argillite	0	0	1	0.3	0	0
chalcedony	16	9.9	44	12.0	3	50.0
chert	13	8.0	83	22.7	2	33.3
miscellaneous coarse	4	2.5	4	1.1	0	0
miscellaneous fine	4	2.5	5	1.4	0	0
quartz	0	0	7	1.9	0	0
quartzite	39	24.1	70	19.1	0	0
quartzose	7	4.3	2	0.6	0	0
silicified peat	16	9.9	18	4.9	0	0
silicified siltstone	0	0	4	1.1	0	0
silicified wood	33	20.4	46	12.6	0	0
Knife River flint	3	1.9	4	1.1	0	0
Swan River chert	27	16.7	78	21.3	1	16.7
total	162	100.2	366	100.1	6	100

4.3.5 Block 2, Occupation 5

Occupation 5 is associated with the upper portion of the light brown / tan sand layer seen in the profiles of excavation Block 2 (Figure 4.9). The fifth occupation consists of the materials recovered from arbitrary levels 5 and 6 in 13 of the 14 units which comprise Block 2. The materials from levels 5 and 6 are discussed as a single occupation based on the refit of a lithic tool (discussed below). The south wall profile shows rodent burrows throughout the light brown / tan sand layer but a relatively even interface with the upper brown sand layer (Figure 4.9). The east wall profile however indicates a high degree of disturbance associated with depths of 40 to 60 centimeters below surface, depths assigned to Occupation 5. The northernmost portion of the east wall profile shows two possible areas of deflation and indicates that in at least one of excavation units the soil associated with Occupation 4 extends to a depth assigned to Occupation 5 (Figures 4.9 and 4.11). The materials from unit 292N 247E

are excluded from Occupation 5 due to high degree of disturbance visible in the unit's walls and have been designated as Occupation 5A (discussed separately). The photograph of the northern section of the excavation block (Figure 4.11) also shows the dark mottling characteristic of the soil seen in both excavation blocks and all occupations at site EgNn 9.

Figure 4.11 North wall profile and disturbance in northeast corner , Block 2, Site EgNn 9. View north.

As noted previously, the materials recovered from arbitrary levels 5 and 6 are discussed as a single occupation based on the refit of a lithic tool. The retouched cobble spall manufactured of banded purple quartzite was recovered *in situ* during excavation in the 2001 season (Figure 4.12). The proximal end of the tool was collected from level 5 in unit 289N 247E (Cat.No. 2552) while the distal end of the tool was recovered in level 6 of unit 290N 247E (Cat.No. 2545). Discussion of the two levels as a single occupation is substantiated by the results of the shovel test from the 2000 season. All of the cultural materials from shovel test #21 were collected from an occupation identified at a depth of 45 to 60 centimeters BS, depths which correspond

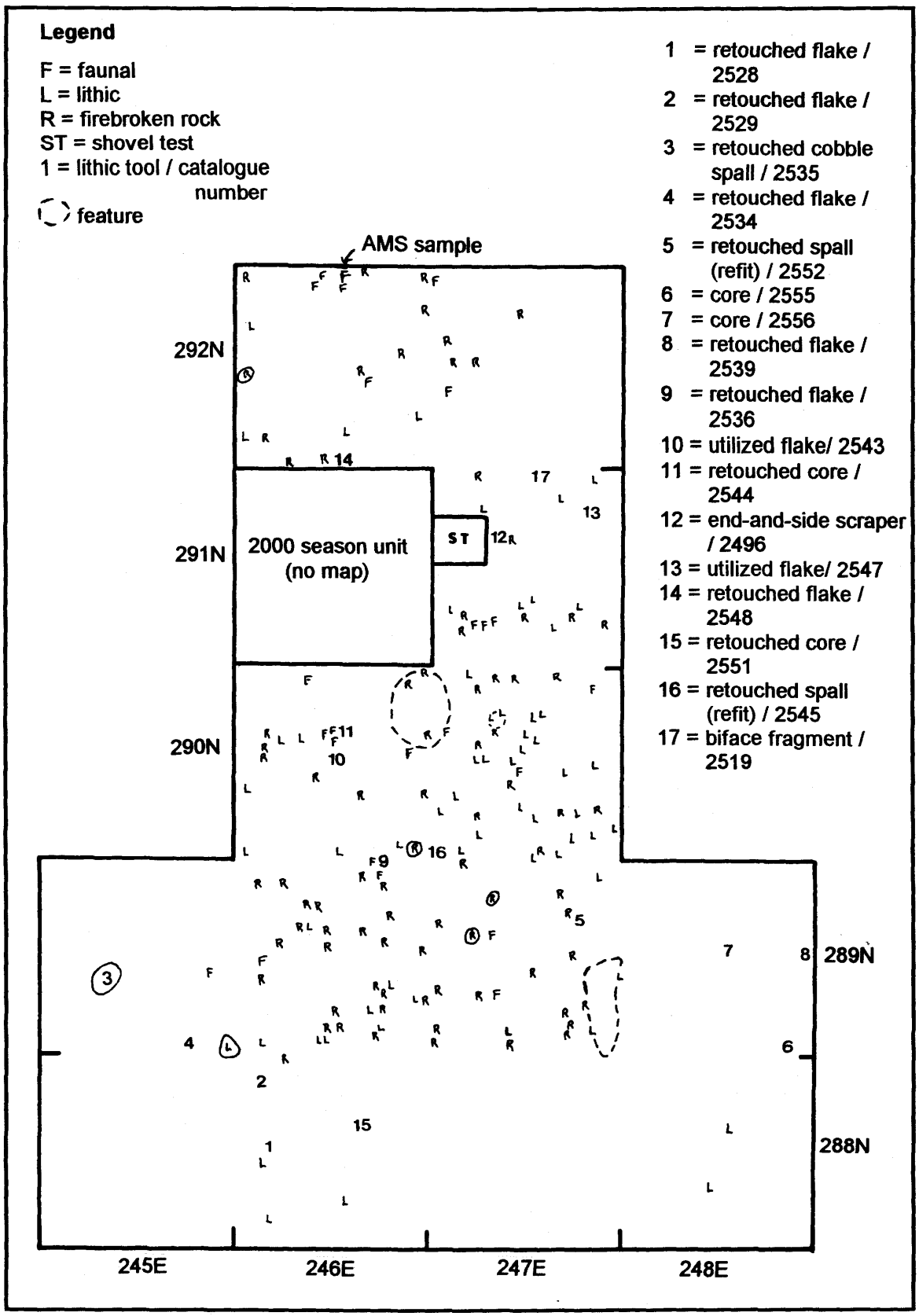


Figure 4.12 Planview of Occupation 5, Block 2, site EgNn 9.

with the fifth occupation identified during the 2001 season. The materials from shovel test #21 are discussed in conjunction with unit 291N 247E as the 2000 season unit was placed adjacent to the shovel test rather than being incorporated within the 2000 season excavation unit (Figure 4.12).

During excavation of Occupation 5 two areas of soil discoloration were noted and soil samples were collected for fine screening. The possible cultural feature identified in level 5 of units 290N 246E and 290N 247E consisted of a localized area of dark soil (Figure 4.12). No evidence of charcoal or ash was noted during excavation and fine screening failed to produce cultural materials. The soil stain exhibits the configuration characteristic of many precontact period hearths, however, since cultural materials were not found within its matrix, the soil stain may simply represent a natural phenomenon. The second area of soil discoloration was revealed in level 5 of unit 289N 247E (Figure 4.12). Charcoal and ash were not found in association with the second possible feature, however, fine screening did produce cultural materials. The soil sample collected from the feature contained tooth enamel fragments, burned unidentifiable bone fragments, a single finishing flake, and a snail shell fragment identified as *Valvata sincera helicoidea* which indicates the presence of seasonal standing water. While the soil stain exhibits an irregular shape, the presence of burned bone and shell suggests that the feature is cultural and represents a precontact period hearth. The final possible feature identified in association with Occupation 5 consists of a concentration of lithic debitage noted in level 6 of unit 290N 247E (Figure 4.12). Twenty pieces of Swan River chert representing all stages of lithic reduction were collected from a eight centimeter by eight centimeter area. This concentration of debitage does not contain the density of items which would identify a lithic workshop area and therefore simply represents a cluster of artifacts characteristic of the occupation floor in general.

Occupation 5 demonstrates a dense scattering of cultural materials including a total of 754 faunal specimens weighing 265.3 grams. A single faunal specimen was complete enough to classify to the level of genus and consists of the distal end of an indeterminate-sided humerus identified as *Bison bison*. The age and gender of the bison could not be determined, therefore, seasonality of site-use can not be

determined. The humerus fragment (33.8 gm) was submitted for AMS dating and produced a date of 4600 ± 40 years BP (Beta # 167308, UofS 9-4). Three faunal specimens identified as Rodentia were recovered from Occupation 5 and include a single innominate (0.1 gm) and two unidentifiable fragments (0.1 gm) which show evidence of owl predation and therefore do not represent precontact period resources. A single innominate fragment (10.8 gm) and three long bone fragments (19.1 gm) were classified as Artiodactyla, however, additional information as to gender and age could not be assessed. The remainder of the faunal assemblage recovered from Occupation 5 was too fragmented to classify. Excavation resulted in the recovery of 474 unaltered indeterminate bone and tooth enamel fragments (152.9 gm), 74 calcined indeterminate bone and tooth enamel fragments (11.3 gm), and 198 burned indeterminate bone and tooth enamel fragments (37.2 gm). Four of the 474 unaltered fragments (0.1 gm) and 17 of the 198 burned fragments (0.1 gm) were recovered from the fine screening of the soil from the possible feature in unit 289N 247E. The distribution map shows a concentration of faunal materials in the units which contain the possible features but also in the units directly adjacent (Figure 4.13). As such the faunal materials appear to be scattered across the occupation floor in general and do not appear to define specific activity areas.

Excavation of Occupation 5 also resulted in the collection of two snail shell fragments. A shell classified as *Valvata sincera helicoidea* was recovered from the fine screen sample of the possible feature in unit 289N 247E. The shell represents evidence of seasonal standing water within the site vicinity and may relate to water being carried to the site for cooking activities. As such, the *Valvata sincera helicoidea* shell does not represent a precontact food source or decorative item. The remaining snail shell fragment (0.1 gm) was too fragmentary to identify as to species or function.

A high density of firebroken rock was collected in association with Occupation 5 of Block 2 at site EgNn 9. A total of 495 pieces of firebroken rock weighing 3554.0 grams was recovered and the assemblage is dominated by fragments of miscellaneous coarse grained material. Seventeen miscellaneous coarse grained material fragments belonging to the 5-10 centimeter size category (2133.9 gm) and 473 fragments from the 0-5 centimeter size category (1357.4 gm) were collected

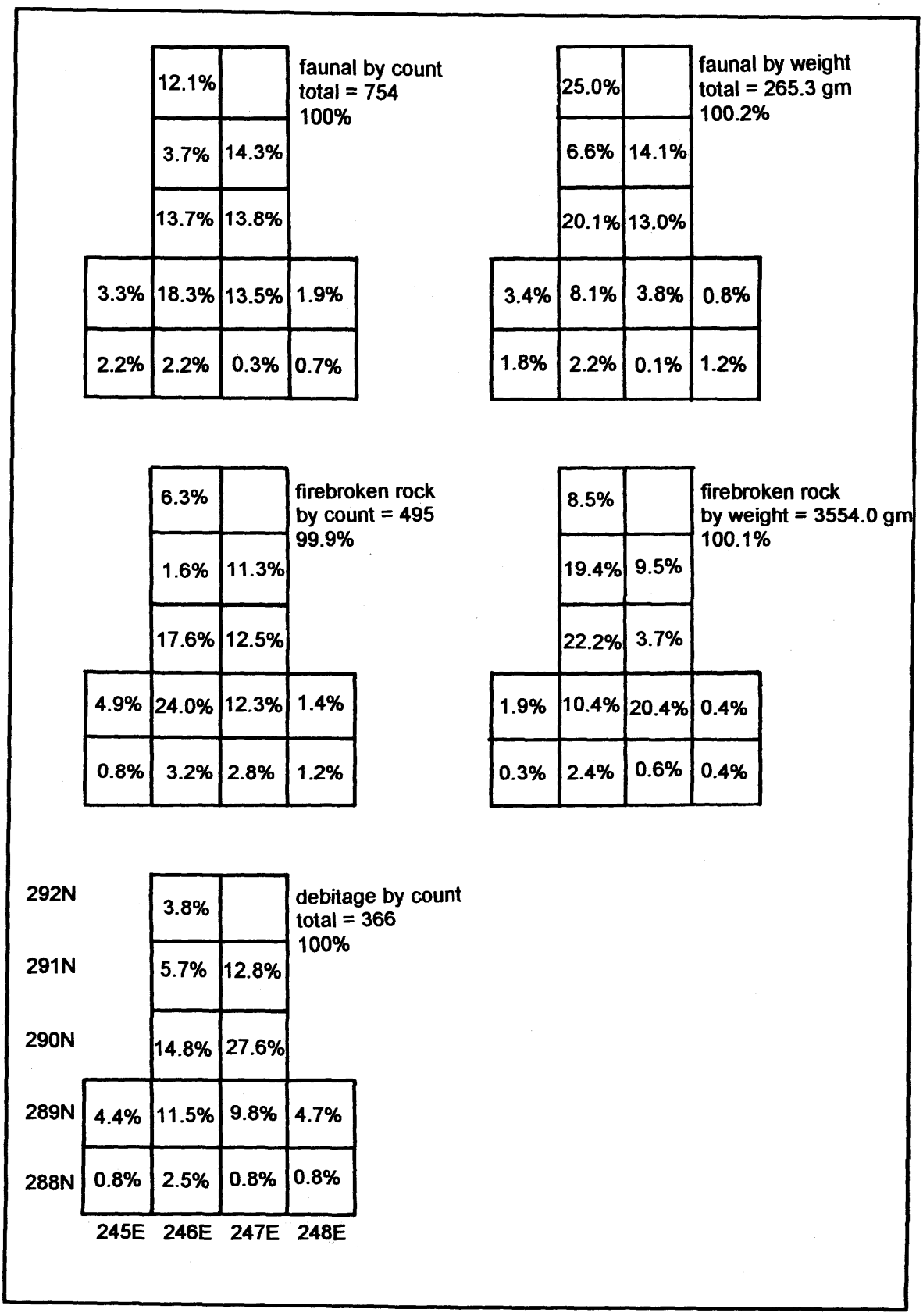


Figure 4.13 Artifact distribution maps, Occupation 5, Block 2, site EgNn 9.

during excavation. The remainder of the firebroken rock assemblage consists of a single fragment from the 5-10 centimeter size category (37.2 gm) and four fragments belonging to the 0-5 centimeter size category (25.5 gm) manufactured of materials classified as hard cobble / quartzite. Distribution of the firebroken rock associated with Occupation 5 does not identify specific activity areas or cultural features and conforms to the generalized pattern seen in the faunal and lithic assemblages (Figure 4.13). Artifact distribution shows a higher density across the center of the excavation block with lesser amounts of cultural materials recovered from the peripheries.

The lithic assemblage associated with Occupation 5 includes a relatively high percentage of lithic tools, with five finished tools and 18 expediency tools (in 19 pieces) recovered during excavation. The finished lithic tools consist of two biface tip fragments, two preforms / fragments, and a single end-and-side scraper. The biface tip fragments consist of a brown chalcedony tip (Cat.No. 883) collected from the 2000 season unit and a Knife River flint tip (Cat.No. 2519) recovered during the 2001 season (Figure 4.12). The preforms include a failed preform manufactured of brown silicified wood (Cat.No. 846) from the 2000 season unit and a preform fragment manufactured of Swan River chert (Cat.No. 2521) collected during the 2001 season. The end-and-side scraper manufactured of Swan River chert (Cat.No. 2527) was recovered *in situ* during excavation in the 2001 season (Figure 4.12). The lithic expediency tool assemblage from Occupation 5 includes the retouched cobble spall which facilitated the demarcation of the occupation. The refit tool manufactured of purple quartzite was recovered *in situ* from level 5 of unit 289N 247E (Cat.No. 2552) and level 6 of unit 290N 247E (Cat.No. 2545) (Figure 4.12). Also recovered during the 2001 season were a tan limestone retouched cobble spall (Cat.No. 2535) which possibly served as a chopper, a retouched core fragment manufactured of heated silicified wood (Cat.No. 2544) which may be a failed preform (fracture patterns do not allow for definitive classification), and a retouched core fragment of yellow quartzite (Cat.No. 2551). Excavation of Occupation 5 also resulted in the recovery of seven retouched flakes, three retouched flake fragments, and four utilized flakes. All of the retouched flakes collected during the 2001 season were recovered *in situ* (Figure 4.12) and include three tools of silicified wood (Cat.No. 2529, 2536, and 2539) and two tools made of Swan River chert (Cat.No. 2528 and 2534). The remaining two

retouched flakes were collected during the 2000 season and both are of Swan River chert (Cat.No. 847 and 882). The three retouched flake fragments include a tan chert fragment (Cat.No. 2542), a Swan River chert fragment (Cat.No. 2537), and a silicified wood fragment (Cat.No. 2548). Only the silicified wood retouched flake fragment was recovered *in situ* (Figure 4.12). Two of the four utilized flakes collected in Occupation 5 were recovered *in situ* (Figure 4.12) and include a silicified peat tool (Cat.No. 2543) and a silicified wood tool (Cat.No. 2547). The remaining utilized flakes are of heated silicified wood (Cat.No. 2533) and Knife River flint (Cat.No. 2541). Knife River flint represents the only lithic trade material present in the tool assemblage of Occupation 5 with a single biface tip (Cat.No. 2519) and a single utilized flake (Cat.No. 2541) manufactured of the material. The lithic tools were recovered from across the excavation block in 10 of the 13 units containing Occupation 5 materials.

The lithic assemblage from Occupation 5 also includes two cores and 366 pieces of debitage. A test core manufactured of grey quartzite (Cat.No. 2556) and a failed core of tan limestone (Cat.No. 2555) were recovered during the 2001 season (Figure 4.12). The debitage assemblage includes pieces from all stages of the lithic reduction sequence. Forty-five flakes from the early stage of reduction (12.3%), 60 second stage flakes (16.4%), 141 final stage flakes (38.5%), and 120 flake fragments / shatter (32.8%) were recovered during excavation. The debitage assemblage is dominated by locally available materials with Knife River flint and argillite representing possible trade materials (Table 4.5). Distribution of debitage across the excavation block shows the same generalized pattern seen with the other cultural material, with a higher concentration of materials through the center of the excavation (Figure 4.13). A single Swan River chert final stage flake was recovered during fine screening of the matrix from a possible hearth feature in unit 289N 247E. The flake concentration (Figure 4.12) noted during excavation contained a total of 20 pieces of Swan River chert debitage which in itself does not represent a density consistent with a lithic workshop. The unit (290N 247E) as a whole contains the highest percentage of debitage present in a single unit, 27.6 %, which would suggest that the unit represents the center of a lithic workshop. The distribution maps for the lithic assemblage, however, do not show a highly centralized pattern of artifact dispersion which would indicate a specific activity area (Figure 4.13).

4.3.6 Block 2, Occupation 5A

Occupation 5A contains materials which can not be confidently assigned to a specific period of site utilization. Cultural materials recovered from arbitrary levels 5 and 6 of unit 292N 247E have been extracted from Occupation 5 and discussed as a separate entity. The designation of the separate occupation for these materials is due to the high degree of disturbance evident in wall profiles of the northeast section of the excavation block (Figures 4.9 and 4.11). The profiles show the continuation of the brown sand layer associated with Occupation 4 to a depth corresponding with the base of Occupation 5. As such, materials from Occupation 5A may be affiliated with utilization of the site during Occupation 4 or may represent materials from numerous occupations of the site intermixed due to deflation and bioturbation of the sediments.

Occupation 5A consists of a relatively light scattering of cultural materials including 36 faunal specimens, 23 pieces of firebroken rock, two expediency lithic tools, and six pieces of lithic debitage. The faunal assemblage includes 19 unaltered indeterminate bone and tooth enamel fragments (6.1 gm), two calcined indeterminate bone and tooth enamel fragments (0.1 gm), and 13 burned indeterminate bone and tooth enamel fragments (2.5 gm). Two additional faunal specimens were recovered from Occupation 5A and consist of a single long bone fragment classified as Artiodactyla (4.8 gm) and an innominate fragment identified as Anura (0.1 gm). The Artiodactyla long bone fragment suggests a connection with Occupation 5 which contained comparable long bone fragments. The Anura innominate may represent evidence of the degree of disturbance associated with Occupation 5A. During the 2001 field season numerous Plains spadefoot toads (*Anura Pelobatidae Spea bombifrons*) were encountered when crew members removed the disturbed backfill from the 2000 season units to facilitate expansion of the excavation blocks at both sites EgNn 9 and EgNo 23.

The firebroken rock assemblage associated with Occupation 5A consists of 23 miscellaneous coarse grained material fragments weighing a total of 53.8 grams. All of the firebroken rock fragments belong to the 0-5 centimeter size category. The lithic assemblage from the occupation includes two expediency tools. The retouched flake fragments (Cat.No. 2549 and 2550) are manufactured of the same material, silicified

wood, and may represent non-conjoining fragments of the same tool. The remainder of the lithic assemblage from Occupation 5A consists of six pieces of debitage including a single final stage flake (16.7%) and five flake fragments / shatter (83.3%). The entire lithic collection represents locally available materials (Table 4.5).

While the area of soil disturbance noted in Block 2 concentrates in a single unit, 292N 247E, it is possibly the area of deflation extends into adjacent units. The north wall profile (Figure 4.11) suggests that the area of deflation extends approximately 10 centimeters into unit 292N 246E while the east wall profile (Figure 4.9) suggests that the disturbance extends approximately 40 centimeters into unit 291N 247E. Major differences in soil colour and texture were not noted during excavation, therefore, the degree of disturbance in the adjoining units is assumed to be minor. Extrapolating the approximate extent of the area of deflation suggests that some of the artifacts mapped on the floor plan of Occupation 5 may be within the disturbance zone. Three pieces of debitage, four firebroken rock fragments, a utilized flake (#13 on map), and a biface tip fragment (#18 on map) are possibly located within the area of deflation (Figure 4.12).

4.3.7 Block 2, Occupation 6

Occupation 6, as identified during excavation of Block 2 at site EgNn 9, is associated with the lower portion of the light brown / tan sand layer seen in wall profiles (Figure 4.9). The relatively light scattering of cultural materials was recovered from arbitrary level 7 in 13 of the 14 units which comprise Block 2. Due to time constraints levels 7 and 8 of unit 288N 245E were not excavated. The cultural material recovered from Occupation 6 includes 52 faunal specimens weighing a total of 30.9 grams. The assemblage includes a single long bone fragment (10.5 gm) identified as Artiodactyla which suggests a link with Occupation 5. However, the long bone fragment was collected from unit 290N 246E, south of the upper area of soil disturbance. The remainder of the faunal assemblage consists of 26 unaltered indeterminate bone and tooth enamel fragments (13.3 gm), four calcined indeterminate bone and tooth enamel fragments (0.8 gm), and 21 burned indeterminate bone and tooth enamel fragments (6.3 gm).

The lithic assemblage associated with Occupation 6 includes 24 firebroken rock fragments, a single expediency tool, and 22 pieces of debitage. The firebroken rock collection is comprised of 24 fragments of miscellaneous coarse grained material belonging to the 0-5 centimeter size category (87.9 gm). The expediency tool found in association with Occupation 6 consists of a utilized flake manufactured of Swan River chert (Cat.No. 2530). The debitage assemblage contains flakes representing all stages of lithic reduction including three early stage flakes (13.6%), seven second stage flakes (31.8%), five final stage flakes (22.7%), and seven flake fragments / shatter (31.8%). The lithic assemblage is dominated by locally available materials (Table 4.6).

Table 4.6 : Lithic material types represented by debitage recovered from Occupations 6 and 7 ; Block 2, site EgNn 9, Permit 01- 45.

MATERIAL TYPE	OCCUPATION 6		OCCUPATION 7	
	count	%	count	%
chalcedony	0	0	2	20.0
chert	4	18.2	1	10.0
miscellaneous fine	3	13.6	1	10.0
quartz	0	0	2	20.0
quartzite	5	22.7	2	20.0
quartzose	1	4.6	0	0
silicified peat	0	0	1	10.0
silicified siltstone	5	22.7	1	10.0
silicified wood	2	9.1	0	0
Swan River chert	2	9.1	0	0
total	22	100	10	100

4.3.8 Block 2, Occupation 7

The final possible occupation identified during excavation of Block 2 consists of the materials recovered from arbitrary level 8. The light scattering of cultural materials was recovered from the base of the light brown / tan sand layer seen in profiles (Figure 4.9). Cultural materials associated with Occupation 7 were recovered from 10 of the 14 units which comprise Block 2. Three units proved sterile of cultural materials (288N 246E, 288N 248E, and 292N 246E) while a single unit (288N 245E) was not excavated.

Excavation of Occupation 7 resulted in the collection of 15 faunal specimens, eight fragments of firebroken rock, and 10 pieces of lithic debitage. The faunal assemblage consists of 12 unaltered indeterminate bone and tooth enamel fragments (4.4 gm), a single calcined indeterminate bone fragment (0.5 gm), and two burned indeterminate bone fragments (0.2 gm). The firebroken rock assemblage is comprised of a single fragment of miscellaneous coarse grained material belonging to the 5-10 centimeter size category (135.4 gm) and seven fragments from the 0-5 centimeter size category (51.1 gm). The lithic assemblage contains flakes representing all stages of lithic reduction including three early stage flakes (30.0%), two second stage flakes (20.0%), four final stage flakes (40.0%), and a single flake fragment / shatter (10.0%). The assemblage consists of locally available lithic materials (Table 4.6).

4.4 Summary of All Occupations Identified at Site EgNn 9

Archaeological investigation at site EgNn 9 has involved three separate seasons of monitoring, surface collection, testing, and controlled excavation. The first season of archaeological investigation involved the initial identification of the site through monitoring of pipeline activities during the summer of 1999. Cultural materials recovered from the disturbed sediments associated with the Alliance Pipeline Limited (Calgary) pipeline corridor provided evidence of typical precontact period campsite activities. Cultural materials included firebroken rock, faunal specimens, lithic tools, and lithic debitage, all of which denote precontact camping and the processing of game animals hunted within close proximity of the site. Of particular interest was the recovery of projectile points which have been assigned to the Late Plains, Avonlea, Sandy Creek, and Pelican Lake archaeological time periods. The projectile points confirmed that precontact populations repeatedly utilized the sandhills region in which site EgNn 9 is located.

The 2000 season was aimed at clarifying the time frame of site utilization and determining the horizontal and vertical extent of the site. Shovel tests were placed across the site, on both sides of the pipeline corridors which bisect site EgNn 9. Controlled excavation of 1m x 1m units revealed the presence of multiple, intact buried occupations across the entire site. All of the occupations identified within the

shovel tests and 1m x 1m units provided evidence of typical precontact campsite activities. The buried occupations could not be correlated due to the horizontal distances which separate the test units and not all the occupations could be assigned to a specific archaeological time period due to a lack of time diagnostic artifacts and materials suitable for radiometric dating. Three of the 2000 season units could be dated due to the recovery of time diagnostic artifacts, namely the collection of complete projectile points from intact buried occupations. Besant phase projectile points were recovered from units on both sides of the pipeline corridors, specifically from level 4 in unit 195N 291E and level 3 of unit 281N 245E. As well, a Pelican Lake phase projectile point was recovered from level 7 of unit 285N 235E located on the north side of the pipeline corridors. Through the dating of these occupations it could be determined that site EgNn 9 was inhabited before, during, and after both the Besant and Pelican Lake phases.

The final season of archaeological investigation at site EgNn 9 focused on the intact buried occupations identified north of the pipeline corridors intersecting the site. Units on the north side of the corridors contained evidence of long-term habitation of the site and it was believed that expansion on the 2000 season units would reveal detailed evidence of numerous precontact period activities associated with multiple buried components. Excavation during the 2001 season identified a possible 16 distinct buried components within two excavation blocks. Excavation Block 1 revealed eight possibly distinct occupations of site EgNn 9 while Block 2 contained evidence of seven possible occupations of the site and an additional mixed component which may relate to the intermingling of materials from the aforementioned occupations. Of these components, five occupations warrant detailed discussion. The other occupations are identified by light scatters of cultural materials and may in fact represent displaced materials from these five more definitive occupations.

Excavation Block 1 contains two occupations which can be assigned to specific archaeological time periods and an additional occupation which can be tentatively assigned to a third time period. Occupation 4 of Block 1 represents a Besant component at site EgNn 9, Occupation 5 represents a Pelican Lake phase component, while Occupation 6 can tentatively be classified as an Oxbow component.

Evidence of the Besant occupation of site EgNn9 consists a dense scattering of cultural materials which reflect use of the region for camping and such activities as the processing of game animals for food and hides, and the manufacture and repair of lithic tools. A well defined hearth (Figures 4.4 and 4.5) was encountered in Occupation 4, however, the associated scattering of cultural materials does not define other specific activity locales (ie. lithic workshops, hide processing areas, etc.). A faunal sample from the occupation was submitted for AMS dating (Beta # 167305, UofS 9-1) but the date was rejected due to diagenetic changes to the bone.

Occupation 5 in Block 1 denotes utilization of the sandhills during the Pelican Lake time period and also contains evidence of typical campsite activities. The relative date of site-use has been determined by the recovery of two Pelican Lake phase projectile points during excavation. The occupation is represented by a relatively light scattering of cultural materials characteristic of precontact period campsite activities. A faunal sample was submitted for AMS dating (Beta # 167306, UofS 9-2) but was rejected due to contamination of the faunal sample.

Occupation 6 in Block 1 is associated with a relatively light scattering of cultural materials and has tentatively been assigned to the Oxbow phase based on the recovery of a projectile point. The projectile point displays alterations to its original configuration so can not be confidently classified to a specific archaeological culture. The reworked projectile point shares characteristics displayed by both Oxbow phase points and Sandy Creek phase points, but is tentatively classified as Oxbow due to the fact that the point was recovered from an occupation below a known Pelican Lake occupation. The Oxbow time period predates Pelican Lake while Sandy Creek appears to represent an archaeological time period which follows the Pelican Lake phase. A faunal sample was submitted for AMS dating (UofS 9-3) to clarify the date of site utilization represented by Occupation 6, however, the sample proved too fragmentary for successfully radiometric dating.

No diagnostic artifacts were recovered during excavation of Block 2, therefore, the occupations can not be assigned to specific archaeological phases. Two major occupations of site EgNn 9 were identified in Block 2 and both Occupation 4 and

Occupation 5 contain evidence of typical precontact period campsite activities. Occupation 4 consists of a dense scattering of cultural materials found within the brown sand layer associated with both the Besant and Pelican Lake occupations seen in Block 1. Occupation 5 in Block 2 also contains a dense scattering of artifacts but is associated with the light brown / tan sand layer which contains the possible Oxbow occupation in Block 1. However, the stratigraphy revealed within the excavation blocks can not be definitively correlated due to the distance separating the blocks and the migratory depositional nature of sandhills. A faunal sample from Occupation 5 in Block 2 was submitted for AMS dating (Beta # 167308, UofS 9-4) and produced a date of 4600 ± 40 years BP. While the radiometric date would appear to link Occupation 5 in Block 2 with the possible Oxbow occupation of Block 1, the questionable veracity of the AMS dates obtained in Block 1 raises doubts as to the accuracy of the single AMS date obtained from Block 2.

Regardless of whether the occupations can be assigned to a specific archaeological phases, excavation at site EgNn 9 has produced clear evidence of multiple periods of site utilization. Each excavation block, test unit, and shovel test has revealed multiple occupations of the site, and testing has determined that precontact utilization of the site encompasses an area at least 100 meters north/south by 160 meters east/west. Site EgNn 9 represents successful precontact utilization of the sandhills throughout the last 5000 years of the cultural sequence of the Great Plains archaeological record.

CHAPTER 5
SITE EgNo 23 : PRELIMINARY INVESTIGATION

Construction of the Alliance Pipeline Limited natural gas pipeline resulted in the identification of archaeological site EgNn 9, discussed in the previous two chapters, and also resulted in additional impact to a previously recorded archaeological site, site EgNo 23. Site EgNo 23 is located within a cultivated field approximately 1000 meters northwest of site EgNn 9 along the pipeline corridors which bisect both sites. Archaeological site EgNo 23 contains evidence of repeated precontact utilization of the sandhills region dating back approximately 5000 years. The lower components identified at site EgNo 23 date to the McKean Series and are discussed in a recent doctoral dissertation (Webster 2004). The upper components identified at site EgNo 23 date to the Pelican Lake and Besant phases and are discussed in detail in chapter 6. The following chapter provides a summary of archaeological investigation prior to the 2001 field season. A complete description of all lithic tools recovered during the 1999, 2000, and 2001 field seasons are included in Appendix B.

5.1 Initial Identification

Site EgNo 23 was first recorded in 1986 by an amateur collector who recovered an Avonlea projectile point, a Late Period triangular projectile point, a biface (all manufactured of Swan River chert), and an incised bone tube from the cultivated field in which the site is located. The site was assessed in 1993 prior to construction of the Interprovincial Pipeline Inc. natural gas pipeline (now Enbridge Pipeline). Archaeological assessment (Permit 93-69) resulted in the collection of three fragments of firebroken rock, one piece of calcined bone, and 22 pieces of lithic debitage (all of locally available materials), however, monitoring during construction of the IPL / Enbridge pipeline (Permit 94-32) failed to yield additional materials.

5.2 Preliminary Investigation and Analysis (Permit 99-19)

Site EgNo 23 was revisited prior to construction of the Alliance Pipeline Limited natural gas pipeline which parallels the northern side of the Enbridge pipeline right-of-way. During the summer of 1996 four shovel test were completed resulting in the collection of a single piece of lithic debitage, a quartzite flake recovered from a depth of 20 centimeters below ground surface (Permit 96-91). FMA Heritage Resources Consultants Inc. (Calgary), the heritage consultants contracted by Alliance Pipeline Limited (Calgary), recommended archaeological monitoring during construction of the new pipeline based on the presence of buried cultural materials and the unique environmental setting of the site (FMA Heritage Resources Consultants 2002b). It was following clearance of the 32 meter wide right-of-way and the extra temporary work space located at the pipeline's crossing of a grid road that significant archaeological resources were identified at site EgNo 23 (FMA Heritage Resources Consultants 2002a).

Archaeological monitoring, conducted under Permit 99-19, resulted in the recovery of cultural materials from within the disturbed sediments associated with the newly-cleared right-of-way. These materials included 39 finished lithic tools, 26 expediency tools, 20 cores, and 486 pieces of lithic debitage. A total of 13 projectile points / point fragments were recovered and are associated with the Middle and Late Periods, including an Avonlea projectile point, two Besant points, one possible Pelican Lake point, one possible Hanna point, one McKean point, and seven projectile points too fragmentary to confidently assign to a specific archaeological time period (Table 5.1). The finished tools (Table 5.2) and the expediency tools (Table 5.3) collected from site EgNo 23 represent artifacts associated with typical precontact period campsite and kill site activities. The 20 cores (Table 5.4) and 486 pieces of lithic debitage (Table 5.5) recovered from disturbed sediments represent all stages of lithic reduction, however, discussion of lithic technology and preferences during specific time periods is not possible due to the mixed context from which the assemblage was collected. In addition to the lithic tools and debitage collected from the right-of-way, 341 fragments of firebroken rock were recovered. The firebroken rock assemblage includes 126 hard cobble / quartzite pieces weighing a total of 9335.7 grams and 215 fragments of miscellaneous coarse grained material weighing 19,114.9 grams. The

lithic assemblage reflects the repeated use of the sandhills region throughout Plains prehistory and suggests use of the site area for typical campsite activities.

Table 5.1 : Projectile points recovered from disturbed sediments, site EgNo 23, Permit 99-19.

TOOL TYPE	MATERIAL TYPE	CAT. NO.
Avonlea projectile point	Montana chert	79
Besant projectile point fragment	Swan River chert	76
possible Besant projectile point	grey porcellanite	75
possible Pelican Lake projectile point	brown chalcedony	81
possible Hanna projectile point	silicified wood	78
flake projectile point, possible Late Period	brown chalcedony	80
projectile point fragment	grey porcellanite	77
projectile point fragment	silicified wood	442
projectile point fragment	Swan River chert	83, 85, 88, 283
projectile point fragment	indeterminate, heat damaged	82

Table 5.2 : Finished tools recovered from disturbed sediments, site EgNo 23, Permit 99-19.

TOOL TYPE	MATERIAL TYPE	CAT. NO.
biface, nearly complete	silicified peat	113
biface, nearly complete	Swan River chert	84
biface fragment	brown chert	89
biface fragment	yellow quartzite	86
biface fragment	Swan River chert	87, 96, 198, 284, 597, 630
preform	Swan River chert	233
end + side scraper	black pebble chert	93
end + side scraper	Swan River chert	97, 98
endscraper	arenaceous chert	92
sidescraper	silicified wood	95
sidescraper	Swan River chert	91
reverse scraper	quartzite	112, 657
scraper fragment	white chert	358
scraper fragment	Swan River chert	90, 94
wedge	white quartzite	119
wedge	Swan River chert	117, 128, 129

Table 5.3 : Expediency tools recovered from disturbed sediments, site EgNo 23, Permit 99-19.

TOOL TYPE	MATERIAL TYPE	CAT. NO.
retouched bipolar core	Swan River chert	660
retouched cobble spall	purple quartzite	655
retouched flake	white chalcedony	329
retouched flake	white chert	327, 342
retouched flake	yellow chert	332
retouched flake	brown quartzite	656
retouched flake	white quartzite	274
retouched flake	Cathead chert	192
retouched flake	Swan River chert	101
retouched flake fragment	white quartzite	195
retouched flake fragment	silicified wood	114, 181, 240, 304
retouched flake fragment	Montana chert	115
retouched flake fragment	Swan River chert	118, 221, 393
utilized nodule	silicified wood	301
utilized shatter	Swan River chert	310
utilized flake	black pebble chert	111
utilized flake	feldspathic siltstone	340
utilized flake	Swan River chert	124
utilized flake fragment	silicified siltstone	306
utilized flake fragment	Swan River chert	209

Table 5.4 : Cores recovered from disturbed sediments, EgNo 23, Permit 99-19.

CORE TYPE	MATERIAL TYPE	CAT. NO.
bipolar	black pebble chalcedony	110
bipolar	silicified wood	183
bipolar	white quartz	190
exhausted bipolar	white quartz	295
exhausted bipolar	white quartzite	293, 297
exhausted bipolar	Swan River chert	661
multidirectional	white quartzite	104
multidirectional	yellow quartzite	107
multidirectional	Swan River chert	99, 103
exhausted multidirectional	white quartzite	191
exhausted multidirectional	silicified wood	185
unidirectional	brown quartzite	102
	yellow quartzite	100
core fragment	white quartz	294
core fragment	brown quartzite	105
core fragment	yellow quartzite	150, 151
core fragment	Swan River chert	109

Table 5.5 : Lithic material types represented by debitage recovered from disturbed sediments, site EgNo 23, Permit 99-19.

MATERIAL TYPE	COUNT	% OF TOTAL
basalt	5	1.0
chalcedony	26	5.3
chert	31	6.4
feldspathic siltstone	4	0.8
miscellaneous fine grained	2	0.4
porcellanite	14	2.9
quartz	16	3.3
quartzite	93	19.1
silicified peat	3	0.6
silicified siltstone	2	0.4
silicified wood	32	6.6
Gronlid siltstone	1	0.2
Montana chert	3	0.6
Knife River flint	1	0.2
Swan River chert	253	52.1
total	486	99.9

However, it was during top soil stripping near the pipeline crossing of the grid road at site EgNo 23 that the most remarkable cultural materials were revealed. Faunal specimens collected *in situ* or in slightly disturbed context revealed a precontact period bison kill located 40 to 50 centimeters below ground surface. A total of 4249 faunal specimens weighing 79.583 kilograms were collected from the newly disturbed sediments of the right-of-way and extra temporary work space. More than 50 % of the complete and near complete elements were identified as *Bison bison* and the remaining assemblage, while too fragmentary to confidently assign to species, are robust enough to be considered remains of the same animals. Herd composition appears to be largely male with at least 19 animals represented by the identifiable elements recovered. Examination of the faunal remains led to the identification of butchering marks consistent with the skinning, filleting, and dismemberment of game animals and the consequent extraction of marrow from freshly butchered bone. The bison kill appears to represent a mid to late summer event using the sandhills as natural traps for an ambush style of hunting. Faunal samples were submitted for radiocarbon dating and produced dates of 3540 ± 50 years BP and 3530 ± 50 years BP. As such, the kill event dates are consistent with the McKean Series and are discussed in detail in a recent doctoral dissertation (Webster 2004).

Even though the date of the bison kill event had not been determined, the presence of such high quantities of identifiable faunal remains in buried context, the identification of the site as a bison pound located within the sandhills, and the presence of multiple buried archaeological components assigned substantial scientific value to archaeological site EgNo 23 (FMA Heritage Resources Consultants 2002a). Additional archaeological investigation at site EgNo 23 was recommended to and approved by the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation (FMA Heritage Resources Consultants 2002a).

5.3 Preliminary Excavation and Analysis (Permit 2000-31)

The recommended additional archaeological investigation at site EgNo 23 was aimed at defining the areal extent of the site, determining the presence and range of the buried components at the site, and identifying any intact deposits associated with the bison kill recorded during monitoring (FMA Heritage Resources Consultants 2002b). A total of 64 auger tests and ten 1m x 1m excavation units were placed on both sides of the Alliance and Enbridge pipeline corridors (Figure 5.1). Testing revealed that cultural materials are present in buried contexts on both the north and south sides of the pipeline corridors which bisect the site. Surface collection of materials from the pipeline right-of-ways was also conducted during the 2000 field season. The disturbed sediments within the immediate vicinity of the bison kill identified the previous season were examined in detail, as were the sediments extending to the immediate southeast of the kill. A total of 416 highly fragmented pieces of indeterminate bone and tooth enamel weighing 22.0 grams were recovered, and 163 of the faunal specimens are calcined (8.6 gm) while four fragments are burned (1.4 gm). Also recovered from the disturbed sediments associated with the pipeline corridor were three pieces of hard cobble / quartzite firebroken rock (138.2 gm) and two fragments of miscellaneous coarse grained material firebroken rock (229.9 gm).

The lithic assemblage recovered from the disturbed sediments of the pipeline corridors includes three projectile points (Besant, Hanna, McKean), three preforms, seven expediency tools, four cores (Table 5.6), and 38 pieces of lithic debitage (Table 5.7). The lithic assemblage is dominated by locally available materials and represents all stages of lithic reduction including 10 early stage flakes (26.3%), 10 second stage

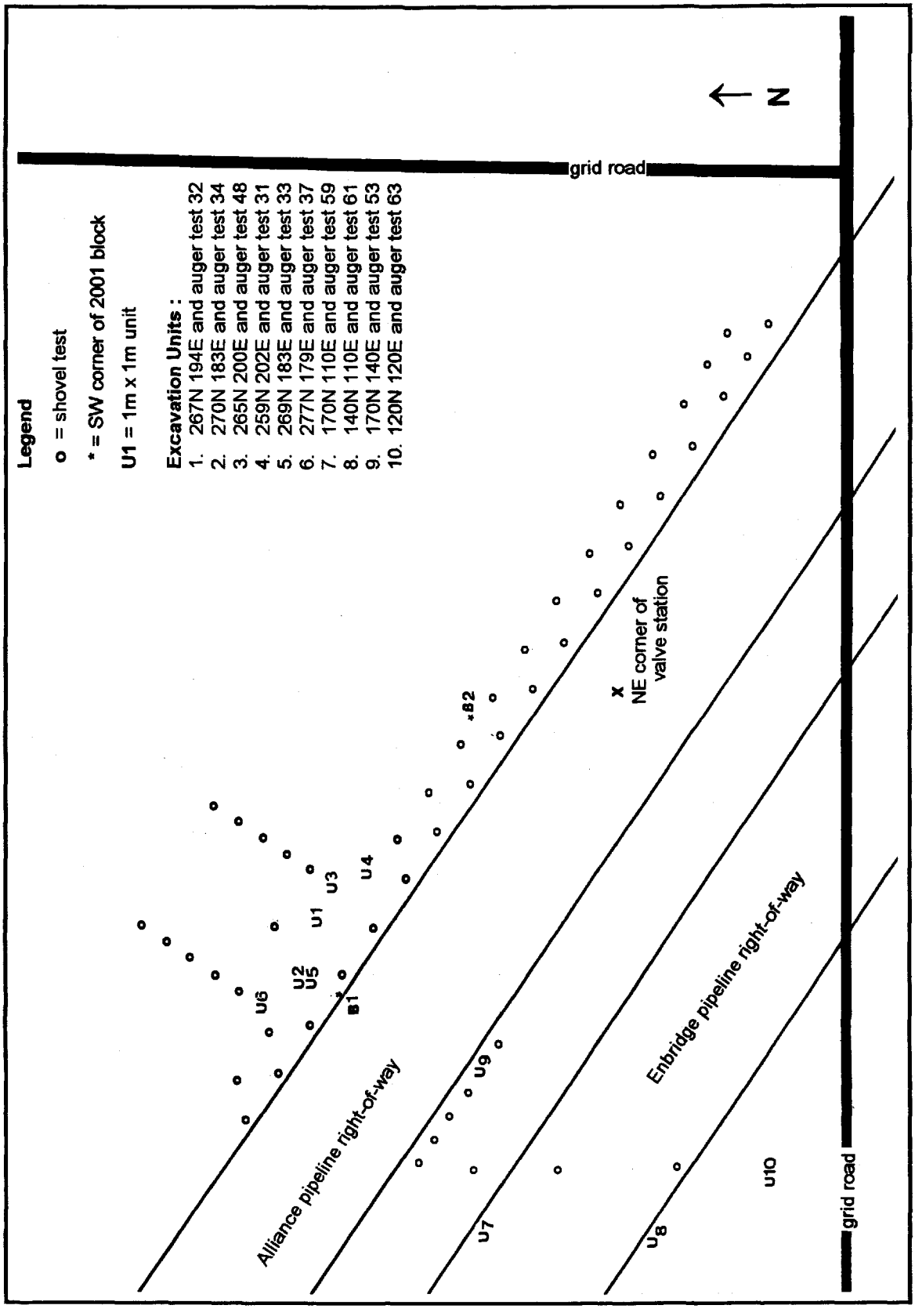


Figure 5.1 Site map showing 2000 season test units and auger tests, site EgNo 23.

flakes (26.3%), 11 final stage flakes (29.0%), and seven flake fragments / shatter (18.4%). Discussion of lithic technology and preferences during specific time periods is not possible due to the mixed context from which the lithic assemblage was collected. The cultural materials collected from the disturbed sediments of the pipeline corridors reflect typical precontact period campsite activities.

Table 5.6 : Lithic tools and cores recovered from disturbed sediments, site EgNo 23, Permit 00-31.

TOOL TYPE	MATERIAL TYPE	CAT. NO.
Besant projectile point	Swan River chert	1500
Hanna projectile point	basalt	1501
McKean projectile point	Swan River chert	1499
preform	silicified wood	1502
preform	Swan River chert	1493, 1494
retouched flake	black pebble chert	1498
retouched flake	yellow quartzite	1443
retouched flake	Swan River chert	1495
retouched flake fragment	grey chert	1504
retouched flake fragment	white chert	1429
retouched flake fragment	Knife River flint	1503
utilized flake fragment	yellow pebble chert	1410
exhausted bipolar core	white quartz	1409
exhausted bipolar core	Swan River chert	1497
core fragment	Swan River chert	1416, 1496

Table 5.7 : Lithic material types represented by debitage recovered from disturbed sediments, site EgNo 23, Permit 00-31.

MATERIAL TYPE	COUNT	% OF TOTAL
chalcedony	4	10.5
chert	2	5.3
porcellanite	1	2.6
quartzite	9	23.7
silicified wood	1	2.6
Swan River chert	21	55.3
total	38	100

5.3.1 Auger Tests and Excavation Units South of the Pipeline Corridors

Archaeological testing across the cultivated field on the south side of the Alliance corridor at site EgNo 23 included the completion of 16 auger tests (# 1-4, # 53-64) and four 1m x 1m excavation units (# 7-10) (FMA Heritage Resources Consultants 2002b:101). No time diagnostic artifacts were recovered during testing

and the auger tests placed near the bison kill deposit failed to identify intact buried remains associated with the kill event. Eight of the 16 auger tests placed south of the pipeline corridors proved positive and reveal a light scattering of cultural materials across the area tested. In total , the auger tests produced 40 indeterminate bone and tooth enamel fragments weighing 44.4 grams. Three of the faunal fragments are calcined (0.4 gm) while four fragments are burned (3.6 gm). Auger testing also resulted in the recovery of a single piece of miscellaneous coarse grained material firebroken rock weighing 58.8 grams. The lithic assemblage collected during auger testing is dominated by locally available materials and includes a single wedge of Swan River chert (Cat.No. 1473) and a single retouched flake of Cathead chert (Cat.No. 692), with the expediency tool representing the only trade material recovered during auger testing. A total of 16 pieces of lithic debitage (Table 5.8) were collected from the eight positive auger tests on the south side of the corridors and consists of two early stage flakes (12.5%), six final stage flakes (37.5%), and eight flake fragment / shatter (50%). The cultural material recovered from the eight positive auger tests denote the use of the sandhills region for typical precontact period campsite activities.

Table 5.8 : Lithic material types represented by debitage recovered from auger tests, south side of corridor, site EgNo 23, Permit 00-31.

MATERIAL TYPE	COUNT	% OF TOTAL
chert	1	6.3
porcellanite	1	6.3
quartzite	6	37.5
quartzose	1	6.3
silicified wood	1	6.3
Swan River chert	6	37.5
total	16	100.2

Each of the four 1m x 1m excavation units placed across the southern portion of site EgNo 23 (Figure 5.1) proved positive for cultural material, revealing light scatterings of materials. A total of 270 faunal specimens weighing 342.9 grams were collected and include 232 unaltered indeterminate bone and tooth enamel fragments (138.9 gm), 17 calcined fragments (3.8 gm), and 16 burned fragments (5.4 gm). Identifiable faunal specimens consist of a single cervical vertebra (4 fragments weighing 174.1 gm) from unit 140N 110E and a fused central/fourth tarsal (20.7 gm) from unit 170N 140E which can be classified as *Bison bison*. Firebroken rock consisting of seven hard cobble / quartzite fragments weighing 244.6 grams and 30

miscellaneous coarse grained material fragments weighing 1673.7 grams were collected from the excavation units. A single piece of red ochre (Cat.No. 1506) was also collected during excavation. The lithic assemblage recovered during excavation of the four units on the south side of the pipeline corridors consists of a single endscraper, four expediency tools, two bipolar cores (Table 5.9), and 218 pieces of lithic debitage (Table 5.10). The debitage assemblage includes four early reduction stage flakes (1.8%), eight second stage flakes (3.7%), 153 final stage flakes (70.2%), and 53 flake fragments / shatter (24.3%). Arenaceous chert and feldspathic siltstone represent possible trade materials in an assemblage dominated by locally available materials.

Table 5.9 : Lithic tools and cores recovered from excavation units, south side of corridor, site EgNo 23, Permit 00-31.

TOOL TYPE	MATERIAL TYPE	CAT. NO.
endscraper	black chert	1492
retouched flake	Swan River chert	1084
retouched flake fragment	silicified wood	1189
retouched flake fragment	Swan River chert	1289
utilized flake fragment	brown chalcedony	1374
bipolar core	yellow pebble chert	1395
bipolar core	Swan River chert	1373

Table 5.10 : Lithic material types represented by debitage recovered from excavation units, south side of corridor, site EgNo 23, Permit 00-31.

MATERIAL TYPE	COUNT	% OF TOTAL
arenaceous chert	2	0.9
chalcedony	5	2.3
chert	14	6.4
feldspathic siltstone	2	0.9
miscellaneous coarse grained	1	0.5
porcellanite	2	0.9
quartzite	29	13.3
quartzose	1	0.5
silicified peat	1	0.5
silicified wood	9	4.1
Swan River chert	152	69.7
total	218	100

The predominance of Swan River chert and the relatively high number of lithic artifacts recovered during excavation of the four units on the south side of the pipeline

corridors is skewed due to the discovery of a lithic workshop in level 5 of unit 170N 110E. Excavation of level 5 in unit 170N 110E resulted in the recovery of 126 pieces of lithic debitage including a single second stage flake, 96 final stage flakes, and 29 flake fragments / shatter. The debitage collected from this possible workshop represents 57.8% of the total debitage assemblage recovered from the four units south of the pipeline corridors and 82.9% of the total Swan River chert assemblage from the four units. Taking into account the presence of the lithic concentration, the distribution of the lithic assemblage, faunal materials, firebroken rock, and lithic tools represents a light scattering of materials across the entire tested area. Excavation on the south side of the pipeline corridors suggests use of the area for typical precontact period campsite activities.

5.3.2 Auger Tests and Excavation Units North of the Pipeline Corridors

A total of 48 auger tests (# 5-52) and six 1m x 1m excavation units (# 1-6) were placed across the cultivated field along the north side of the Alliance and Enbridge pipeline right-of-ways at site EgNo 23 during the 2000 field season (FMA Heritage Resources Consultants 2002b:101). Thirty of the 48 auger tests and all six of the excavation units proved positive for cultural materials. Auger testing produced a total of 303 faunal specimens weighing 228.7 grams. The majority of the faunal assemblage consists of indeterminate bone and tooth enamel fragments of which five fragments are calcined (0.2 gm) and two are burned (1.7 gm). Identifiable faunal elements include four molar fragments (45.1 gm), a fused second/third tarsal (11.0 gm), and a humerus fragment (25.8 gm) which can be classified as *Bison bison*. The remaining identifiable element consists of a vertebra fragment (0.1 gm) belonging to the order Rodentia which may represent an intrusive element. Eight pieces of miscellaneous coarse material firebroken rock weighing 237.5 grams were also recovered from the 30 positive auger tests.

The lithic assemblage collected from the auger tests across the northern section of site EgNo 23 includes a single biface fragment manufactured of silicified wood (Cat.No. 1471), a uniface fragment of grey chert (Cat.No. 1472), and a retouched piece of miscellaneous coarse grained material shatter (Cat.No. 673). The debitage assemblage consists of two early reduction stage flakes (5.4%), six second stage flakes (16.2%), 10 final stage flakes (27.0%), and 19 flake fragments / shatter

(51.4%). The lithic assemblage is dominated by locally available materials with only arenaceous chert representing a possible trade material (Table 5.11).

Table 5.11 : Lithic material types represented by debitage recovered from auger tests, north side of corridor, site EgNo 23, Permit 00-31.

MATERIAL TYPE	COUNT	% OF TOTAL
arenaceous chert	10	27.0
chalcedony	4	10.8
chert	4	10.8
miscellaneous coarse grained	1	2.7
quartzite	4	10.8
silicified peat	1	2.7
silicified siltstone	1	2.7
silicified wood	3	8.1
Gronlid siltstone	1	2.7
Swan River chert	8	21.6
total	37	99.9

Six 1m x 1m excavation units were placed across the northern section of site EgNo 23 (Figure 5.1) and three of the units (# 2, 3, and 5) were directly expanded upon during the 2001 field season as part of the main excavation block (see chapter 6). As such the materials from those units will be discussed in conjunction with the materials recovered during the 2001 season. The remaining three excavation units (# 1, 4, and 6) revealed multiple occupations of the site area. All of the excavation units along the northern section of site EgNo 23 were relocated and tied into the newly corrected grid system. Unit # 4 is located five meters to the south of the main 2001 excavation block with the corrected coordinates of 259N 202E. Unit # 6 is located five meters to the north of the main block with the corrected coordinates of 277N 179E while unit # 1 (267N 194E) is located just one meter north of the block. Given the depositional characteristics of the sandhills environment, the materials recovered from these units can not be confidently correlated with the buried occupations identified during excavation of the main block and, therefore, are summarized below.

Unit 259N 202E produced a light scattering of materials from the upper five levels with levels 1 through 4 containing only faunal materials. Level 1 produced two unaltered indeterminate bone and tooth enamel fragments (2.0 gm), level 2 produced a single unaltered indeterminate tooth enamel fragment (0.5 gm), level 3 produced a single burned indeterminate bone fragment (1.0 gm), and level 4 produced two

unaltered indeterminate bone and tooth enamel fragments (0.4 gm). Level 5 contained four unaltered indeterminate bone and tooth enamel fragments (7.5 gm) and a single flake fragment of silicified wood. Level 6 revealed evidence of a larger scale campsite with the recovery of a total of 620 faunal specimens (259.8 gm), a single fragment of miscellaneous coarse grained material firebroken rock (31.9 gm), and 10 pieces of lithic debitage. The faunal assemblage from level 6 is dominated by indeterminate bone and tooth enamel fragments including 579 unaltered fragments weighing 120.2 grams and 32 burned fragments weighing 3.3 grams. Also recovered from level 6 of unit 259N 202E were six vertebra fragments (92.7 gm) and a single left second phalanx (25.2 gm) classified as *Bison bison* , and a metapodial fragment (6.6 gm) and a long bone fragment (11.8 gm) classified as Artiodactyla. The debitage assemblage from level 6 consists of a single second stage flake (10%), eight final stage flakes (80%) and a single flake fragment (10%). The debitage assemblage is comprised of locally available materials including chalcedony (n=4, 40%), chert (n=1, 10%), quartzite (n=1, 10%), silicified peat (n=2, 20%), silicified wood (n=1, 10%), and Swan River chert (n=1, 10%). Level 7 of unit 259N 202E proved sterile while level 8 contained five faunal specimens, a single fragment of miscellaneous coarse grained material firebroken rock (6.7 gm), and a biface fragment manufactured of silicified wood (Cat.No. 1489). The faunal specimens recovered from level 8 include two unaltered indeterminate bone fragments (1.1 gm) and a right unciform (11.9 gm), a right internal carpal (11.9 gm), and a right ulnar carpal (14.4 gm) classified as *Bison bison*. The depths of levels 6 and 8 in unit 259N 202E roughly correspond to the McKean Series occupations identified in the main excavation block during the 2001 field season.

The upper two levels of unit 277N 179E proved sterile of cultural materials while level 3 produced a single left *Bison bison* talus weighing 76.3 grams. The remaining levels excavated in unit 277N 179E contain evidence of typical precontact period campsite activities associated with relatively long-term utilization of the site area. Level 4 produced 145 faunal specimens weighing 387.7 grams and three pieces of lithic debitage. The faunal assemblage is dominated by indeterminate bone and tooth enamel fragments including 135 unaltered fragments (141.6 gm) and a single calcined fragment (0.1 gm). Also recovered from level 4 were a right tibia fragment (58.4 gm), a metatarsal fragment (65.4 gm), a right second phalanx (13.3

gm), a first phalanx fragment (10.2 gm), and five thoracic vertebra fragments (98.7 gm) classified as *Bison bison*. The debitage assemblage from level 4 consists of two early reduction stage flakes of Swan River chert and a single final stage flake of quartz.

Excavation of level 5 of unit 277N 179E resulted in the recovery of 82 faunal specimens weighing 42.8 grams, a single fragment of hard cobble / quartzite firebroken rock (3.7 gm), and six pieces of lithic debitage. The level 5 faunal assemblage is also dominated by indeterminate bone and tooth enamel fragments (74 unaltered fragments weighing 31.3 grams and seven burned fragments weighing 2.0 grams) and includes a single left internal carpal (9.5 gm) classified as *Bison bison*. The debitage assemblage consists of a single second stage flake (16.7%) of Swan River chert (16.7%) and five final stage flakes (83.3%) of which two are chert (33.3%), one is Knife River flint (16.7%), and two are Swan River chert (33.3%). Level 6 of unit 277N 179E produced 15 indeterminate bone and tooth enamel fragments weighing 5.5 grams including a single burned fragment (0.1 gm) which displays cut marks indicative of butchering. Nine pieces of lithic debitage were collected from level 6 and consist of three second stage flakes (33.3%), two final stage flakes (22.2%), and four flake fragments (44.4%). The debitage assemblage is comprised of locally available materials including a single piece of chalcedony (11.1%), three quartzite pieces (33.3%), a single silicified wood piece (11.1%), and four pieces of Swan River chert (44.4%).

Excavation of level 7 produced 17 unaltered indeterminate bone and tooth enamel fragments (12.1 gm) and a single lateral malleolus fragment (4.2 gm) classified as *Bison bison*. A single retouched flake of yellow pebble chert (Cat.No. 1172) and five pieces of lithic debitage were also recovered from level 7. The debitage assemblage consists of two second stage flakes (40.0%), a single final stage flake (20.0%), and two flake fragments / shatter (40.0%) manufactured of locally available materials, namely quartzite (n=2, 40.0%) and Swan River chert (n=3, 60.0%). The final level excavated in unit 277N 179E, level 8 contained three final reduction stage flakes of locally available materials (chalcedony n=2, 66.7% ; quartzite n=1, 33.3%). The depths associated with levels 4 through 8 in unit 277N

179E roughly correspond with the McKean Series occupations identified in the main excavation block but can not be directly correlated.

Unit 267N 194E is located just one meter north of the main excavation block and produced a diagnostic artifact, a Hanna projectile point fragment, which allows for tentative correlation with the materials recovered from the main block during the 2001 field season. The upper levels of unit 267N 194E contained a light scattering of cultural materials while the lower occupations are indicative of more intensive or long-term utilization of the site area. Level 1 of unit 267N 194E contained a single unaltered indeterminate bone fragment weighing 5.3 grams and three final reduction stage flakes manufactured of locally available materials (quartzite n=1, 33.3% ; silicified wood n=2, 66.7%). Excavation of level 2 resulted in the recovery of four unaltered indeterminate bone fragments weighing 3.0 grams and a single flake fragment of Swan River chert while level 3 produced six unaltered indeterminate bone fragments weighing 4.3 grams. Level 4 contained two unaltered indeterminate bone fragments weighing 1.1 grams while level 5 produced four unaltered indeterminate bone fragments weighing 1.5 grams, a single final stage flake (33.3%) of Swan River chert (33.3%) and two flake fragments (66.7%) (arenaceous chert n=1, 33.3% ; quartzite n=1, 33.3%).

Excavation of level 6 in unit 267N 194E resulted in the recovery of substantial amounts of lithic material including a Hanna projectile point fragment manufactured of Swan River chert (Cat.No. 1474) and a retouched flake fragment of white chert (Cat.No. 1477). The lithic debitage assemblage from level 6 is dominated by final reduction stage flakes (n=147) which comprise 87.5% of the total assemblage. The remainder of the assemblage includes a single early stage flake (0.6%), a single second stage flake (0.6%), and 19 flake fragments / shatter (11.3%). The lithic assemblage is dominated by locally available materials with arenaceous chert, Knife River flint, and Montana chert representing possible trade materials (Table 5.12). Likewise excavation of level 7 in unit 267N 194E resulted in the recovery of numerous lithic artifacts but also includes faunal material. Five lithic tools were recovered including a preform fragment manufactured of silicified wood (Cat.No. 970), an endscraper of Knife River flint (Cat.No. 1476), two retouched flake fragments (red chert, Cat.No. 1475 ; silicified wood, Cat.No. 1478), and a utilized flake fragment of

white chert (Cat.No. 1505). A total of 220 pieces of lithic debitage were recovered from level 7 and, as with level 6, final reduction stage flakes (n=116) dominate the collection, accounting for 52.7% of the total assemblage. The rest of the debitage assemblage consists of eight early stage flakes (3.6%), 20 second stage flakes (9.1%), and 76 flake fragments / shatter (34.6%). The level 7 lithic assemblage is dominated by locally available materials with arenaceous chert and Knife River flint representing possible trade materials (Table 5.12). Excavation of level 7 in unit 267N 194E also resulted in the recovery of 20 indeterminate bone and tooth enamel fragments weighing 5.0 grams including five calcined fragments (1.4 gm). Eleven fragments of firebroken rock were collected from level 7 and consist of three hard cobble / quartzite pieces weighing 369.4 grams and eight miscellaneous coarse grained material fragments weighing 143.7 grams.

Table 5.12 : Lithic material types represented by debitage recovered from unit 267N 194E, levels 6 and 7, site EgNo 23, Permit 00-31.

MATERIAL TYPE	LEVEL 6		LEVEL 7	
	count	%	count	%
arenaceous chert	34	20.2	41	18.6
chalcedony	22	13.1	7	3.2
chert	29	17.3	73	33.2
porcellanite	2	1.2	0	0
quartz	1	0.6	0	0
quartzite	7	4.2	26	11.8
silicified peat	7	4.2	6	2.7
silicified siltstone	1	0.6	0	0
silicified wood	17	10.1	28	12.7
Knife River flint	1	0.6	2	0.9
Montana chert	3	1.8	0	0
Swan River chert	44	26.2	37	16.8
total	168	100.1	220	99.9

Level 8 of unit 267N 194E produced a total of 49 indeterminate bone and tooth enamel fragments weighing 18.2 grams including eight calcined fragments (3.3 gm) and three burned fragments (0.9 gm). The lithic assemblage associated with level 8 consists of a utilized flake fragment manufactured of Knife River flint (Cat.No. 1094) and 13 pieces of lithic debitage. The debitage assemblage is comprised of a single early stage flake (7.7%), three final stage flakes (23.1%), and nine flake fragments / shatter (69.2%). A possible trade material, arenaceous chert, dominates the debitage assemblage (n=10, 76.9%) with three quartzite pieces (23.1%) completing the collection. Excavation of the final level in unit 267N 194E, level 9, also produced a

lighter scatter of mixed cultural materials. Five unaltered indeterminate bone and tooth enamel fragments weighing 0.1 grams and six pieces of lithic debitage were recovered from level 9. The lithic assemblage consists of two early reduction stage flakes (33.3%), a single second stage flake (16.7%), and three flake fragments / shatter (50.0%). Locally available materials comprise the debitage assemblage including a single piece of chert (16.7%), four pieces of quartzite (66.7%), and a single piece of Swan River chert (16.7%). Recovery of a Hanna projectile point fragment from level 6 of unit 267N 194E and matching depths below surface suggests that levels 6 through 8 in unit 267N 194E correlate with the McKean Series occupations identified during excavation of the main block during the 2001 season.

5.3.3 Summary of Auger Testing and Excavation During the 2000 Season

Archaeological investigation of site EgNo 23 during the 2000 field season involved the excavation of 64 auger tests, ten 1m x 1m units, and the surface collection of artifacts from the disturbed sediments associated with the Alliance and Enbridge pipeline corridors. Testing revealed that the site encompasses an area of at least 175 meters north/south by approximately 175 meters east/west and contains buried components extending to at least 100 centimeters below ground surface. Archaeological investigation confirms that site EgNo 23 is a multicomponent site with intact buried cultural materials on both the north and south sides of the pipeline corridors, however, not all components produced time diagnostic materials. Precontact occupation of the site dating to the McKean Series was identified during excavation of units 267N 194E and 265N 200E, and through radiocarbon dating of the bison kill revealed during monitoring in the 1999 season. Excavation of units expanded upon during the 2001 season produced diagnostic artifacts : a Besant projectile point (unit #5), a possible Pelican Lake point (unit #2), and a Hanna point (unit #3) (see chapter 6). The cultural material recovered during excavation produced evidence of a wide range of precontact period activities including the killing and processing of game animals and the manufacture and repair of lithic tools. The presence of identifiable faunal elements suggested that information regarding seasonality of site-use and the recovery of dateable materials was possible. The presence of paleosols indicated that separation of buried cultural components was also possible at site EgNo 23 and indicated that excavation might reveal stratified McKean, Duncan, and Hanna components (FMA Heritage Resources Consultants

2002b). Additional compensatory excavation was recommended by the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation. Recognizing the significance of the site Alliance Pipeline Limited contracted FMA to conducted the additional excavation while the Department of Archaeology at the University of Saskatchewan was approached to complete the analysis of the archaeological materials recovered. The results of the joint venture project are discussed in the following chapter.

CHAPTER 6
SITE EgNo 23 : BLOCK EXCAVATION AND ANALYSIS

Archaeological investigation associated with construction of the Alliance Pipeline Limited gas pipeline has determined that site EgNo 23 represents multiple occupations of the sandhills region throughout the archaeological sequence of Plains prehistory. Controlled excavation and auger testing proved that intact buried archaeological materials are present on both sides of the Alliance and Enbridge pipeline corridors which run northwest to southeast through the site (Figure 5.1). The excavation of an additional 40 square meters was recommended by the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation based on the results of the 2000 season and the site's potential to provide significant contributions to the understanding of past human occupation of the Douglas Park sandhills (FMA Heritage Resources Consultants 2002b). Additional excavation at site EgNo 23 was conducted by employees of FMA Heritage Resources Consultants (Calgary) and students of the Department of Archaeology at the University of Saskatchewan during the spring of 2001. Excavation was conducted under Type A (Academic) Permit # 01- 45, held by the author. Verbal approval obtained from the Heritage Resources Unit while excavation was in progress permitted expansion of the main excavation block and resulted in the completion of a total of 47 square meters at site EgNo 23 during the 2001 field season. The following chapter consists of a detailed description of the excavation and analysis of materials recovered during the 2001 season while Appendix B contains a complete description of all lithic tools recovered from site EgNo 23 during the 1999, 2000, and 2001 field seasons.

6.1 Methodology

The 2001 field season began with the relocation of the 1m x 1m excavation units completed across the northern section of the site during the 2000 season. The

units provided datum points for the east-west and north-south baselines which created the basis of a universal grid that covers the entire site. The baselines were set using a compass and a 100 meter chain with the southwest corner of unit 265N 200E serving as site datum. The newly established grid identified slight errors in the original grid (for example unit 264N 180E is actually 269N 183E), but the differences have been corrected or compensated for allowing for an accurate, if not completely precise, horizontal provenience across the northern half of the site. Vertical control was established through excavation in arbitrary 10 centimeter levels recorded below datum (BD). Datum stakes were placed adjacent to the blocks to maintain uniform vertical measurements across each excavation block. Site EgNo 23 is located within a relatively flat cultivated field (Figure 6.1). Excavation revealed that soil development within the blocks roughly paralleled the current, relatively flat ground surface. Sediments were removed through shovel shaving and hand trowelling. Whenever possible artifacts over five centimeters in size, or notable items such as lithic tools and identifiable bone, were mapped *in situ* with detailed three-point provenience recorded. All cultural materials were collected and recorded with the minimal provenience of 10 centimeter level and 1m x 1m unit. Artifact concentrations and areas of soil discoloration were mapped and soil samples were collected for fine screening. All sediments were screened using ¼ inch (6 mm) mesh while fine screening was conducted with one millimeter mesh. Curation of materials recovered during excavation included dry brushing of faunal specimens and cleaning of lithic artifacts in untreated water to gently remove loose sediments.

Archaeological excavation conducted during the 2001 field season involved expansion on those 1m x 1m units completed during the 2000 season which contained evidence of long-term utilization of site EgNo 23. The recovery of identifiable faunal specimens, lithic debitage and tools, and firebroken rock indicated that information regarding various past human activities was present in multiple buried components in all of the units placed across the northern section of the site. The main excavation block was placed to maximize exposure of occupations identified in the largest number of 2000 season units. The main block was situated in close proximity to three of the 2000 season units; namely unit # 3 (265N 200E), unit # 2 (270N 183E), and unit # 5 (269N 183E). The units contained a full range of cultural materials as well as time diagnostic artifacts including a reworked Hanna projectile

point from unit # 3, a possible Pelican Lake point from unit # 2, and a Besant projectile point from unit # 5. The additional square meters, whose excavation was verbally approved by the Heritage Resources Unit, enabled expansion of the block and the direct connection of the 2001 season excavation units and the three 2000 season units (Figure 6.2). Placement of Block 2 was aimed at exposure of any possible activity areas associated with the McKean Series bison kill identified during the 1999 season, due to the rarity of such sites in the Northern Plains archaeological record. Sufficient distance separates the two excavation blocks at site EgNo 23 to preclude correlation of the buried occupations identified during excavation (Figure 6.2). As such, the results of each block are discussed separately.

Figure 6.1 General view of the Main Excavation Block at site EgNo 23. Note flat ground surface displayed by cultivated field View northwest.

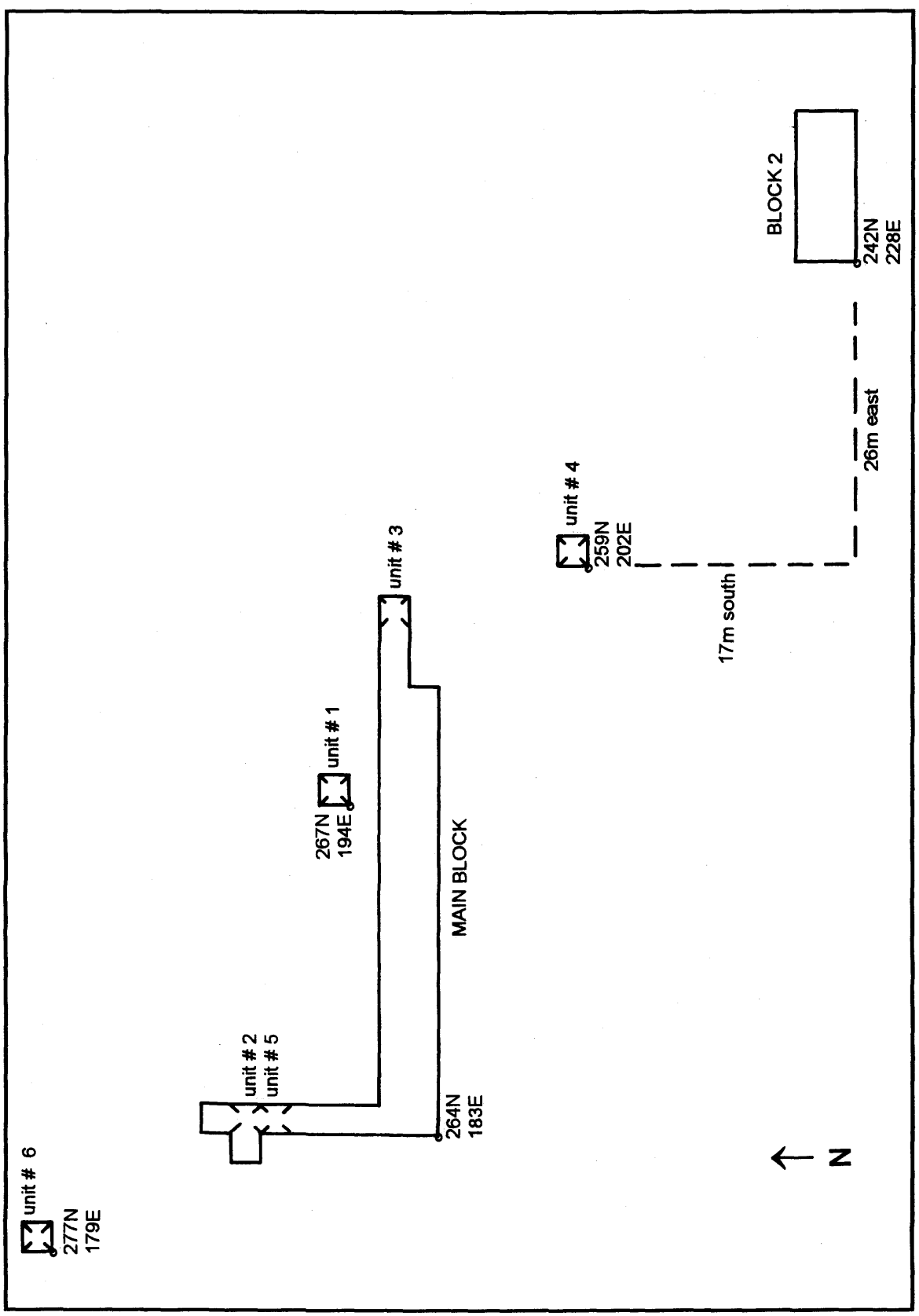


Figure 6.2 Site map showing 2001 season excavation blocks and associated 2000 season test units, site EgNo 23.

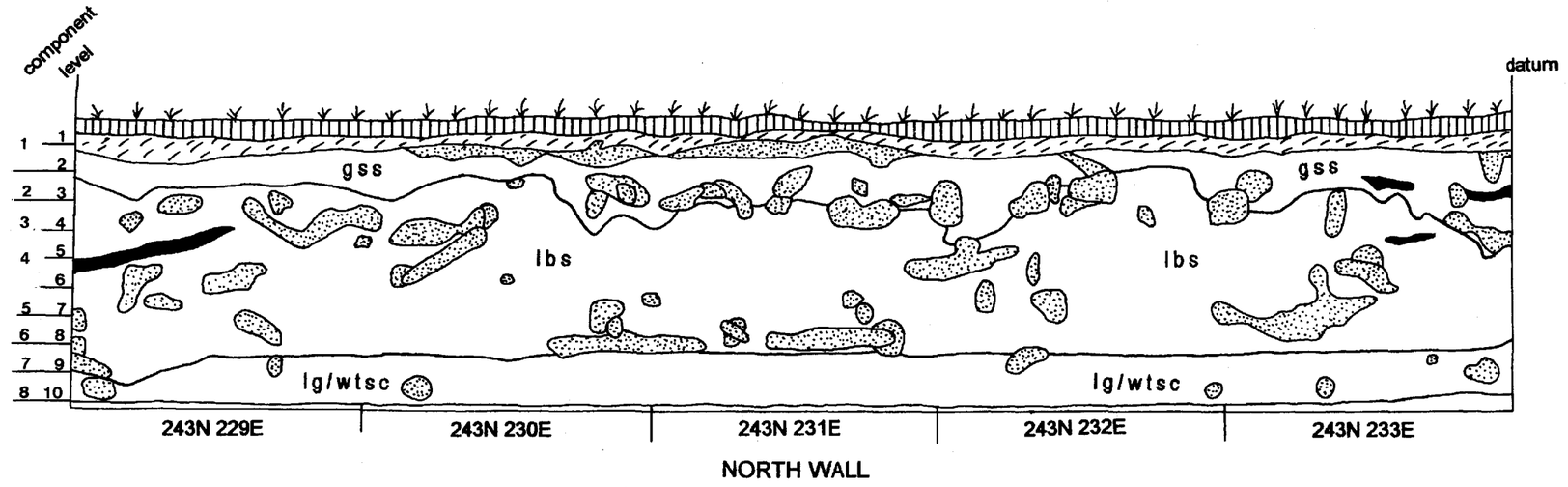
6.2 Excavation Block 2

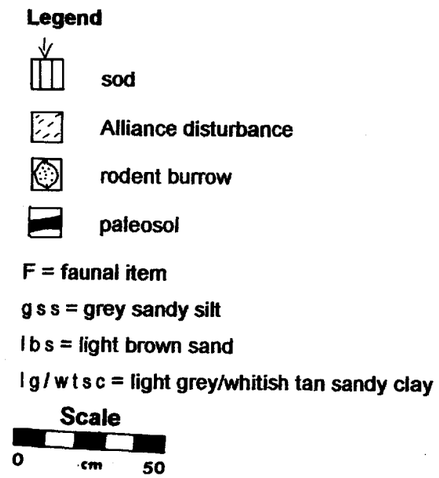
The complexity of sediment deposition within the sandhills environment is clearly evident in the stratigraphy displayed by the 2m x 5m excavation block designated as Block 2 during the 2001 field season at site EgNo 23 (Figure 6.3). Excavation of the 10 units in Block 2 was conducted in ten arbitrary 10 centimeter deep levels to a maximum depth of 110 centimeters BD (100 centimeters below surface). The materials recovered during excavation have been subdivided into eight separate interpretive units (rather than occupations) as materials recovered from Block 2 represent precontact cultural activities, industrial activities, and non-cultural activities. The upper interpretive unit from Block 2 represents the re-deposition of sediments and cultural materials due to pipeline construction while the lower interpretive units may represent the re-deposition of cultural materials due to rodent activities. As such, the materials from these interpretive units do not directly represent human occupation of the site and therefore have been designated as interpretive units rather than occupations.

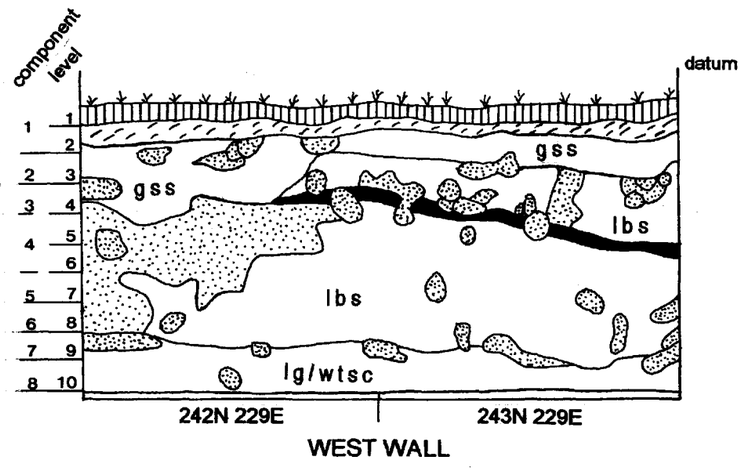
6.2.1 Block 2, Interpretive Unit 1

Interpretive Unit 1 consists of the materials recovered from arbitrary levels 1 and 2 of Block 2 and is comprised of sediments and materials from multiple human occupations of the site. The mixed sediments associated with Interpretive Unit 1 include the black silty loam of the current top soil / sod layer and the mixed sands, silts and clays from the lower levels of the soil profile re-deposited during ditch spoil dumping and pipeline trenching (Figure 6.3). Further disturbance of the upper sediments of the profile is due to compression from heavy equipment traffic during pipeline construction and subsequent agricultural cultivation. The mixed nature of Interpretive Unit 1 is compounded by the fact that the base of arbitrary level 2 has intersected the underlying grey sandy silt layer and by the fact that sediments have been further disturbed due to rodent burrowing (Figure 6.3).

Cultural materials assigned to Interpretive Unit 1 were recovered from all units within Block 2 but due to the mixed nature of the component a discussion of distribution patterns and cultural preferences is invalid. The faunal assemblage recovered from Interpretive Unit 1 consists of a total of 142 specimens weighing 192.7 grams. The assemblage is dominated by indeterminate bone and tooth enamel







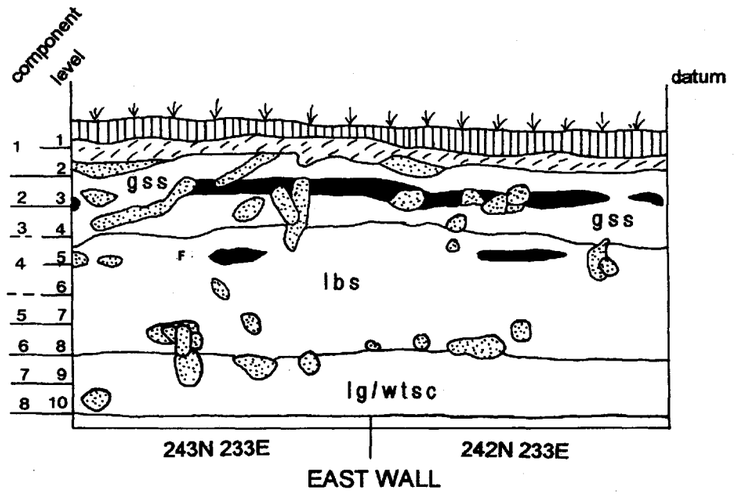


Figure 6.3 Profiles of north, west, and east walls, Block 2, site EgNo 23.

fragments which can not be assigned to specific order or species. The 125 fragments weigh 97.7 grams and include four calcined fragments (1.6 gm) and three burned fragments (2.0 gm). Also recovered was a caudal vertebra fragment (0.7 gm) identified as Artiodactyla, and a single mandible fragment (31.1 gm) and 15 skull fragments (63.2 gm) classified as *Bison bison*. Excavation also resulted in the collection of 40 pieces of firebroken rock weighing a total of 547.0 grams. The firebroken rock assemblage includes four hard cobble / quartzite fragments belonging to the 0-5 centimeter size category (36.2 gm), 34 miscellaneous coarse grained material fragments from the 0-5 centimeter size category (333.1 gm), and two miscellaneous coarse grained material fragments from the 5-10 centimeter size category (177.7 gm).

Lithic artifacts collected from Interpretive Unit 1 include four finished tools, a single expediency tool, two cores, and 38 pieces of debitage. The finished tools include a Hanna projectile point (Cat.No. 5071) manufactured of grey porcellanite which confirms the mixed nature of the interpretive unit as the projectile point most probably is associated with the McKean Series bison kill identified within the adjacent pipeline corridor. The remaining finished tools consist of a preform fragment manufactured of silicified wood (Cat.No. 5098), a failed preform of white quartz (Cat.No. 5099), and a uniface fragment of silicified wood (Cat.No. 5141). The expediency tool is a retouched flake fragment of white chalcedony (Cat.No. 5205) while the core fragments recovered from Interpretive Unit 1 consist of a possible exhausted bipolar core fragment of silicified wood (Cat.No. 5060) and a possible multidirectional core fragment of basalt (Cat.No. 5061). The lithic debitage assemblage is comprised of 11 early reduction stage flakes (28.9 %), five second stage flakes (13.2 %), 15 final stage flakes (39.5 %), and seven flake fragments / shatter (18.4 %). The debitage assemblage is dominated by locally available materials with only argillite representing a possible trade material (Table 6.1).

6.2.2 Block 2, Interpretive Unit 2

The second interpretive unit identified during the excavation of Block 2 at site EgNo 23 is believed to represent precontact human utilization of the sandhills region and consists of the materials recovered from arbitrary level 3. Interpretive Unit 2 roughly corresponds with the patchy paleosol and associated grey sandy silt layer

identified in wall profiles (Figure 6.3). The paleosol is visible in the north wall profile in the eastern corner of the excavation block while the rest of the north wall profile shows deflation of the lower light brown sand layer and subsequent infill with the grey sandy silt which dominates the level. The east wall profile shows a relatively even ground surface reflected by the patchy paleosol. Excavation block wall profiles also show extensive rodent burrowing throughout the grey sandy silt layer.

Table 6.1 : Lithic material types represented by debitage recovered from Interpretive Units 1 and 2; Block 2, site EgNo 23, Permit 01- 45.

MATERIAL TYPE	INTERPRETIVE UNIT 1		INTERPRETIVE UNIT 2	
	count	%	count	%
argillite	2	5.3	0	0
chert	5	13.2	1	7.7
quartz	2	5.3	0	0
quartzite	15	39.5	7	53.9
quartzose	1	2.6	0	0
silicified peat	1	2.6	0	0
silicified siltstone	2	5.3	0	0
silicified wood	0	0	1	7.7
Gronlid siltstone	1	2.6	0	0
Swan River chert	9	23.7	4	30.8
total	38	100.1	13	100.1

Interpretive Unit 2 is represented by a relatively light scattering of materials across the entire excavation block with no clearly defined activity areas identified. The cultural material assemblage includes 32 unaltered indeterminate bone and tooth enamel fragments weighing 20.1 grams and a single pelvis fragment (12.0 gm) classified as *Bison bison*. Eighteen pieces of miscellaneous coarse grained material firebroken rock were also collected from Component 2 and include 17 fragments belonging to the 0-5 centimeter size category (83.1 gm) and a single fragment belonging to the 5-10 centimeter size category (21.3 gm). The lithic assemblage recovered from Interpretive Unit 2 consists of 13 pieces of debitage manufactured of locally available materials (Table 6.1). The debitage assemblage includes two early stage flakes (15.4 %), two second stage flakes (15.4 %), four final stage flakes (30.8 %), and five flake fragments / shatter (38.5 %). Interpretive Unit 2 contains materials associated with typical precontact period campsite activities, however, the absence of time diagnostic artifacts precludes assigning the occupation to a specific archaeological time period.

6.2.3 Block 2, Interpretive Unit 3

The third interpretive unit identified during excavation of Block 2 at site EgNo 23 consists of a relatively dense scattering of cultural materials. Interpretive Unit 3 is associated with the interface between the upper grey sandy silt layer and lower light brown sand layer (Figure 6.3) and consists of the materials recovered from the grey sandy silt in arbitrary level 4 of eight of the 10 units in Block 2. Units 242N 229E and 243N 229E are excluded from Interpretive Unit 3 as wall profiles show that arbitrary level 4 in the two units is associated with the light brown sand layer and, therefore, relate to Interpretive Unit 4. The grey sandy silt layer associated with Interpretive Unit 3 shows a highly uneven surface due to past deflation of the sandy matrix of the site and the numerous rodent burrows provide evidence of significant bioturbation (Figure 6.3).

The majority of the cultural materials associated with Interpretive Unit 3 were recovered from the eastern 3/5 of the excavation block (units 242N 229E and 243N 229E are excluded while units 242N 230E and 243N 230E contained very few artifacts). The faunal assemblage includes 106 indeterminate bone and tooth enamel fragments weighing 54.0 grams of which three fragments are burned (1.7 gm). Also recovered from Interpretive Unit 3 was a single long bone fragment (13.6 gm) classified as Artiodactyla , and a talus (68.4 gm), a fused central/fourth tarsal (10.9 gm), a skull fragment (25.4 gm), and three mandible fragments (20.4 gm) classified as *Bison bison*. A total of 43 fragments of firebroken rock weighing 529.8 grams were collected during excavation of Interpretive Unit 3 in Block 2. The firebroken rock assemblage consists of six hard cobble / quartzite fragments belonging to the 0-5 centimeter size category (56.9 gm), 33 miscellaneous coarse grained material fragments from the 0-5 centimeter size category (177.7 gm), and four miscellaneous coarse grained material pieces from the 5-10 centimeter size category (295.2 gm).

The lithic assemblage of Interpretive Unit 3 is comprised of artifacts manufactured of locally available materials and includes three finished tools, two expediency tools, two cores, and 29 pieces of debitage. The finished tools include two complete wedges (Cat.No. 5128 of grey quartz and Cat.No. 5129 of Swan River chert) and a single wedge fragment of Swan River chert (Cat.No. 5130). The expediency tools include a utilized flake of grey quartzite (Cat.No. 5203) and a utilized

flake of white quartz (Cat.No. 5204). Tool manufacture on-site is suggested by the recovery of an exhausted multidirectional core of Swan River chert (Cat.No. 5062), a core fragment of grey quartzite (Cat.No. 5059), and 29 pieces of debitage (Table 6.2). The debitage assemblage from Interpretive Unit 3 represents all stages of lithic reduction and consists of five early stage flakes (17.2 %), eight second stage flakes (27.6 %), eight final stage flakes (27.6 %), and eight flake fragments / shatter (27.6 %). No specialized activity areas were identified during excavation though the presence of highly fragmented bone, wedges, and firebroken rock suggests the extraction of bone marrow and the processing of bone grease. No time diagnostic artifacts were collected, therefore, the occupation can not be assigned to a specific archaeological time period.

Table 6.2 : Lithic material types represented by debitage recovered from Interpretive Units 3 and 4; Block 2, site EgNo 23, Permit 01- 45.

MATERIAL TYPE	INTERPRETIVE UNIT 3		INTERPRETIVE UNIT 4	
	count	%	count	%
chalcedony	0	0	1	2.4
chert	3	10.4	2	4.8
miscellaenous fine	2	6.9	1	2.4
quartz	0	0	3	7.1
quartzite	17	58.6	25	59.5
quartzose	0	0	1	2.4
silicified wood	2	6.9	0	0
Swan River chert	5	17.2	9	21.4
total	29	100	42	100

6.2.4 Block 2, Interpretive Unit 4

Precontact utilization of site EgNo 23 for typical campsite activities is indicated by the light scattering of cultural materials present in Interpretive Unit 4 of Block 2. The interpretive unit is associated with a patchy paleosol and the surrounding light brown sand layer seen in excavation block wall profiles (Figure 6.3). The paleosol is visible in the eastern corner of the excavation block and displays a relatively even surface in the east wall profile (Figure 6.3). However, the paleosol as seen in the western section of the block displays a highly undulating surface, being alternately visible in arbitrary levels 4, 5 and 6 across the profile (Figure 6.3). As such, Interpretive Unit 4 consists of the materials recovered from arbitrary level 4 in units 242N 229E and 243N 229E plus the materials from arbitrary levels 5 and 6 from the entire excavation block. The light brown sand layer which dominates Interpretive Unit

4 displays numerous rodent burrows including a massive disturbance which renders the materials from unit 242N 229E highly questionable as to cultural affiliation. Mixing of the cultural components is also suggested by the presence of pockets of the upper grey sandy silt in arbitrary level 4 of some of the excavation units.

The cultural materials assigned to Interpretive Unit 4 were recovered from nine of the 10 units which comprise Block 2 (unit 243N 232E proved sterile). Specific activity areas were not discerned during excavation and analysis. No time diagnostic artifacts were recovered and, therefore, this possibly mixed occupation of site EgNo 23 could not be assigned to a specific archaeological time period. The faunal assemblage from Interpretive Unit 4 consists 71 unaltered indeterminate bone and tooth enamel fragments (59.4 gm), and a first phalanx (3.3 gm) and a metapodial fragment (33.6 gm) classified as *Bison bison*. Also recovered during excavation of the component were 24 fragments of firebroken rock weighing a total of 1027.8 grams. The miscellaneous coarse grained material fragments recovered includes 15 pieces belonging to the 0-5 centimeter size category (135.8 gm) and five fragments from the 5-10 centimeter size category (512.5 gm). Hard cobble / quartzite firebroken rock collected from Component 4 consists of two 0-5 centimeter sized fragments (10.6 gm), one 5-10 centimeter sized fragment (14.6 gm), and one 10-15 centimeter sized fragment (354.3 gm).

The lithic assemblage associated with Interpretive Unit 4 is comprised of a single expediency tool and 42 pieces of debitage. A retouched flake fragment of silicified wood (Cat.No. 5206) was recovered and, as with the debitage assemblage (Table 6.2), represents the precontact use of locally available lithic materials. All stages of lithic reduction are represented by the Interpretive Unit 4 debitage assemblage including six early stage flakes (14.3 %), 19 second stage flakes (45.2 %), six final stage flakes (14.3 %), and 11 flake fragments / shatter (26.2 %).

6.2.5 Block 2, Interpretive Unit 5

An extremely light scattering of cultural materials represents the fifth interpretive unit identified in Block 2 of site EgNo 23. Interpretive Unit 5 consists of the materials recovered from arbitrary level 7 and is associated with the light brown sand layer seen in wall profiles (Figure 6.3). The interpretive unit displays numerous

disturbances due to rodent burrowing while the massive disturbance visible in the west wall profile (Figure 6.3) throws into question the assignment of materials from unit 242N 229E to any specific period of site utilization.

Interpretive Unit 5 contains seven unaltered indeterminate bone and tooth enamel fragments (11.0 gm), and a single unidentifiable sesamoid fragment (1.7 gm) classified as *Bison bison*. A single fragment of miscellaneous coarse grained material firebroken rock was recovered during excavation and the 0-5 centimeter sized fragment weighs 5.2 grams. A single flake fragment of miscellaneous fine grained material represents the lithic assemblage from Interpretive Unit 5. The sparse cultural assemblage was recovered from six of the 10 units which comprise Block 2 (units 242N 230E, 242N 231E, 242N 232E, and 243N 233E proved sterile). No specific cultural activities are represented by artifact distribution across the block and no time diagnostic artifacts were recovered. The presence of cultural materials in Interpretive Unit 5 may simply represent natural processes of bioturbation redistributing materials from other occupations of the site.

6.2.6 Block 2, Interpretive Unit 6

The sixth interpretive unit identified during excavation of Block 2 consists of the materials recovered from arbitrary level 8. Interpretive Unit 6 is associated with the base of the light brown sand layer which exhibits numerous rodent burrows (Figure 6.3). The cultural assemblage consists of a single unaltered indeterminate bone fragment (0.1 gm), a utilized flake manufactured of silicified peat (Cat.No. 5202), and four final reduction stage flakes. The lithic assemblage represents locally available materials including a single flake of chalcedony (25 %), two chert flakes (50 %), and a single quartzite flake (25 %). The sparse collection of cultural materials may represent precontact utilization of the site, however, the faunal specimen and the expediency tool were collected from unit 242N 229E which continues to display a massive area of disturbance (Figure 6.3). The final stage flakes were recovered from units 243N 229E, 243N 230E, and 243 231E and may represent redistributed materials due to bioturbation or may represent evidence of a buried occupation located to the north of the excavation block. The time period of precontact utilization of the site could not be determined.

6.2.7 Block 2, Interpretive Unit 7

Cultural material recovered from arbitrary level 9 has been assigned to Interpretive Unit 7 of Block 2 at site EgNo 23. The interpretive unit is associated with the interface between the upper light brown sand layer and the basal light grey / whitish tan sandy clay layer seen in wall profiles (Figure 6.3). A single artifact was recovered from Interpretive Unit 7 and consists of a projectile point fragment manufactured of Knife River flint (Cat.No. 5072). The tip / body fragment is well finished and exhibits the small, narrow dimensions characteristic of Late Period projectile points. As such, the recovery of the finished tool fragment from arbitrary level 9 of unit 243N 229E demonstrates the degree of disturbance present in the excavation block and does not constitute evidence of precontact period utilization of the site at depths associated with arbitrary level 9.

6.2.8 Block 2, Interpretive Unit 8

The final interpretive unit identified during excavation of Block 2 consists of the material recovered from arbitrary level 10. Interpretive Unit 8 is associated with the light grey / whitish sandy clay layer seen in wall profiles (Figure 6.3). Even at basal depths the excavation block profiles show evidence of rodent burrowing. A single final reduction stage flake of miscellaneous fine grained material was collected from unit 242N 231E. The recovery of a single piece of lithic debitage from the base of the excavation block appears to simply represent natural processes of bioturbation and does not represent precontact utilization of the site.

6.3 Main Excavation Block

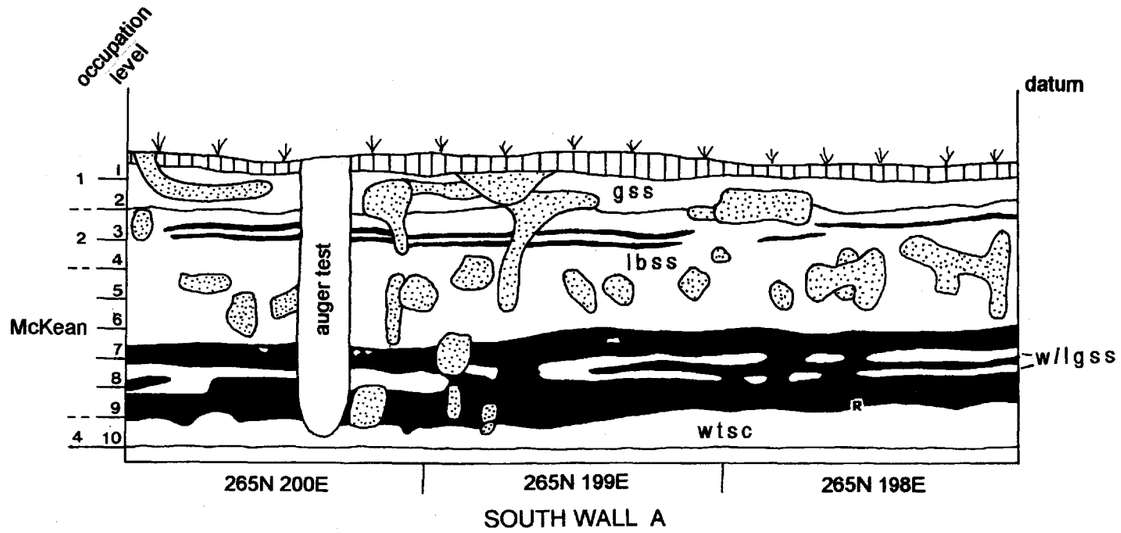
The Main Block at site EgNo 23 encompasses a total of forty 1m x 1m excavation units : 37 units completed during the 2001 field season and three units completed during the 2000 field season. The block consists of an east / west section extending to a maximum length of 18 meters and a northern extension which ties in two of the 2000 field season units (Figure 6.2). Excavation extended to a maximum depth of 120 centimeters below datum (100 cm below surface) across most of the excavation block although some units do not extend beyond 100 centimeters below datum. As with Block 2, the Main Block at site EgNo 23 displays the complexity of sediment deposition within the sandhills environment. The wall profiles of the east / west section of the excavation block shows compression of sediments from the

eastern section of the block towards the western section (Figure 6.4). The ground surface drops by approximately 10 centimeters from unit 264N 197E to unit 264N 183E while the light brown sandy silt layer seen in the profiles compresses from a thickness of 40 centimeters in unit 264N 197E to a thickness of 20 centimeters in unit 264N 183E (Figure 6.4). The lower occupations of site EgNo 23 are associated with the distinctive band of paleosols near the base of the excavation and the basal sandy clay (Figure 6.4 and 6.5). Lower occupations date to the McKean Series and are discussed in a recent dissertation (Webster 2004). The upper levels from the Main Block have been divided into two occupations and are discussed in detail below.

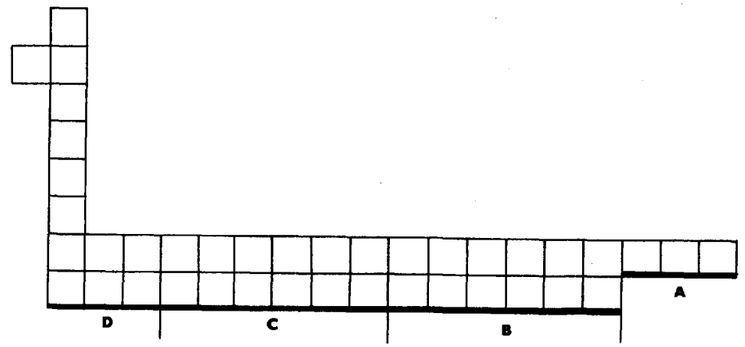
6.3.1 Main Block, Occupation 1

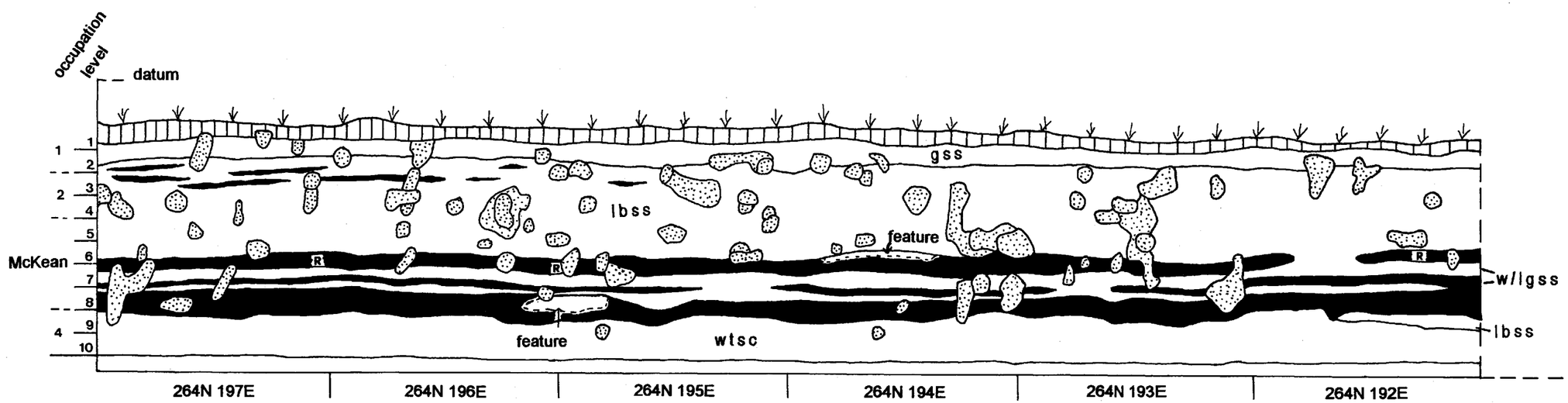
Occupation 1 consists of the materials recovered from the upper black silty loam of the current top soil / sod layer and the underlying grey sandy silt layer seen in wall profiles (Figures 6.4 and 6.5). The occupation includes artifacts recovered from arbitrary level 1 of all units within the Main Block, as well as materials from arbitrary level 2 of 34 units (units 264N 183 to 191E, 193 to 195E; 265N 183 to 191E, 193 to 195E, 198 to 200E; 266 to 271N 183E; 270N 182E) and arbitrary level 3 of unit 271N 183E. The uppermost occupation is associated with the plough zone at site EgNo 23 and corresponds with cultural zone 1 in Webster's dissertation (2004). Occupation 1 of the Main Block of site EgNo 23 represents a Besant occupation of the region, as evidenced by the recovery of three Besant projectile points.

Occupation 1 is represented by a light scattering of cultural materials across the excavation block with only two units proving sterile (units 264N 191E and 264N 196E). The cultural materials are typical of precontact period campsite activities and include a total of 880 faunal specimens weighing 536.5 grams. The faunal assemblage is dominated by indeterminate bone and tooth enamel fragments including 852 unaltered fragments weighing 449.0 grams, seven calcined fragments weighing 2.8 grams, and four burned fragments weighing 1.3 grams. Excavation also resulted in the recovery of four mandible fragments (22.8 gm), three premolar fragments (3.8 gm), five skull fragments (31.6 gm), and a single fused second / third carpal (13.9 gm) classified as *Bison bison*. The faunal assemblage of Occupation 1 also includes two rib fragments (5.1 gm) and a single long bone fragment (6.1 gm) classified as Artiodactyla. The remaining faunal specimen consists of a tibia (0.1 gm)



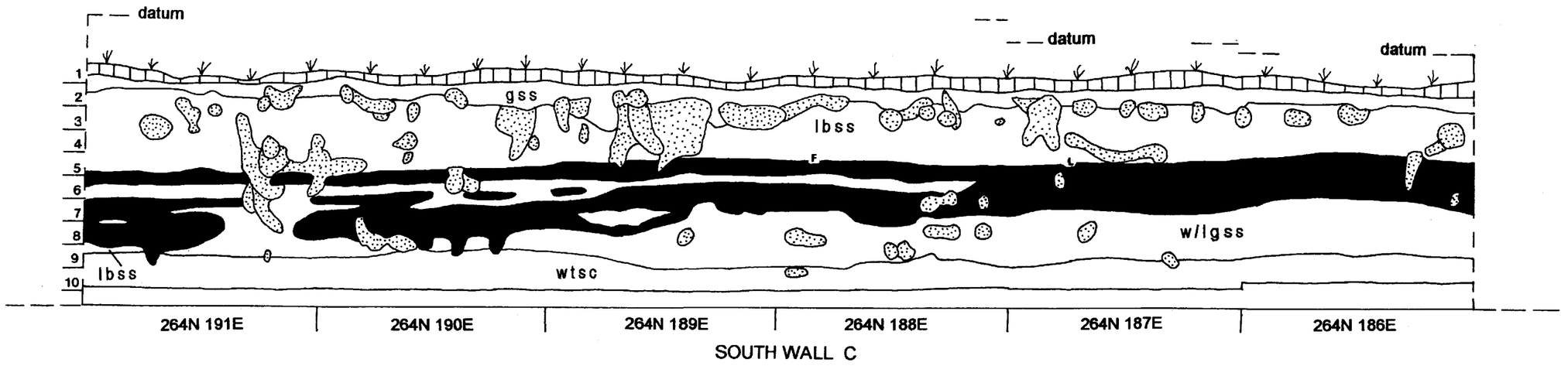
SOUTH WALL A





SOUTH WALL B

Figure 6.4 Profile of south wall, Main Block, site EgNo 23.



SOUTH WALL C

Legend

sod

rodent burrow

paleosol

g s s = grey sandy silt

l b s s = light brown silty sand

w / l g s s = white / light grey sandy silt

w t s c = whitish tan sandy clay

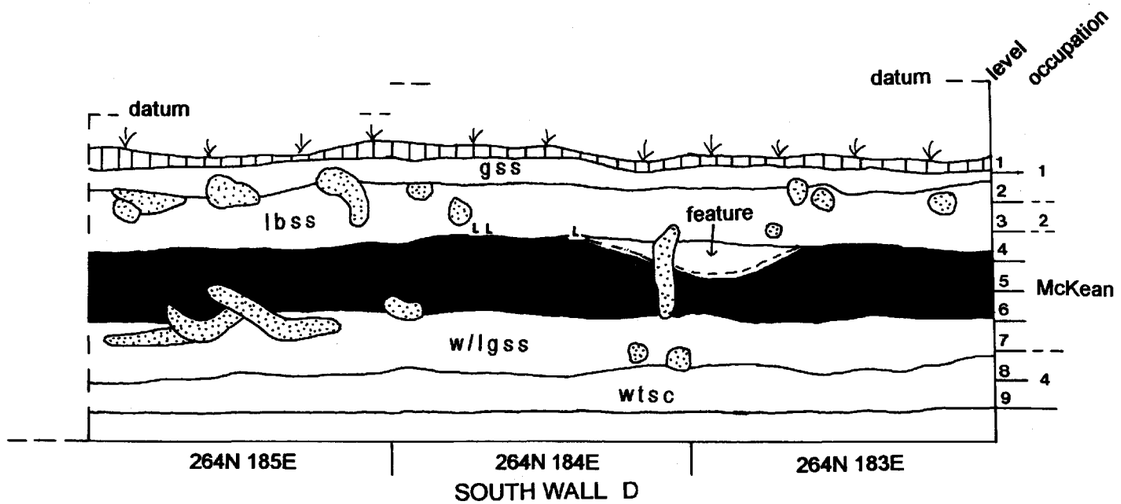
F = faunal item

L = lithic artifact

R = firebroken rock

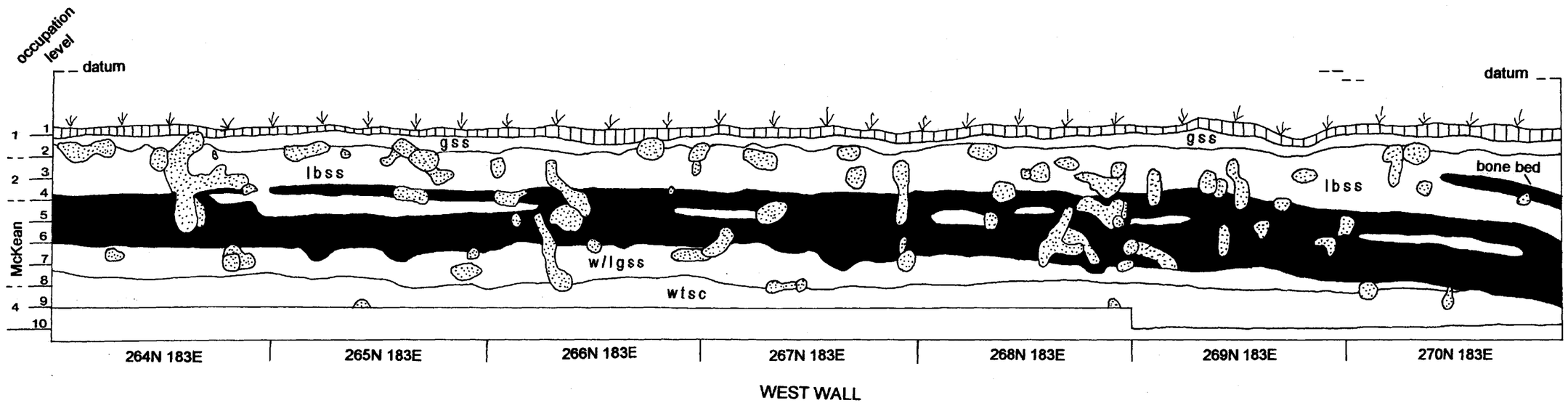
Scale

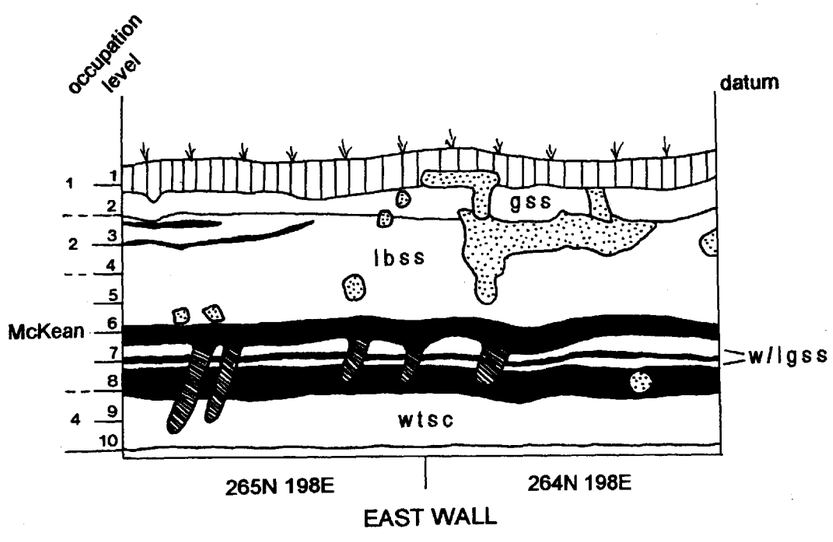
0 cm 50



SOUTH WALL D

Figure 6.4 (continued) Profile of south wall, Main Block, site EgNo 23.





Legend

sod

rodent burrow

paleosol

g s s = grey sandy silt

l b s s = light brown silty sand

w / l g s s = white / light grey sandy silt

w t s c = whitish tan sandy clay

Scale

0 cm 50

Figure 6.5 Profiles of west and east walls, Main Block, site EgNo 23.

identified as *Thomomys talpoides* (northern pocket gopher) which represents an intrusive element. Excavation of Occupation 1 also resulted in the recovery of 81 fragments of firebroken rock consisting of 73 miscellaneous coarse grained material fragments belonging to the 0-5 centimeter size category (232.4 gm), seven hard cobble / quartzite fragments from the 0-5 centimeter size category (38.7 gm), and one hard cobble / quartzite fragment from the 5-10 centimeter size category (98.4 gm).

The lithic assemblage associated with Occupation 1 of the Main Block at site EgNo 23 consists of six finished lithic tools, three expediency tools, two cores, and 110 pieces of lithic debitage. Three Besant projectile points were recovered from both arbitrary level 1 and arbitrary level 2 of the occupation providing a relative date for site utilization and suggesting a correlation between the levels. A complete, moderately finished Besant projectile point of silicified wood (Cat.No. 1490) was recovered from arbitrary level 1 of unit 269N 183E during the 2000 field season. Excavation during the 2001 season resulted in the *in situ* recovery of a complete, well finished Besant point of silicified wood (Cat.No. 5070) from arbitrary level 2 of unit 270N 182E and the collection of a reworked Besant point, also of silicified wood, (Cat.No. 5066) from arbitrary level 2 of unit 265N 186E. The remaining finished tools consist of an endscraper of silicified wood (Cat.No. 5103) collected from arbitrary level 2 of unit 264N 186E, a sidescraper of Knife River flint (Cat.No. 5104) collected from arbitrary level 2 of unit 264N 193E, and the proximal end of a scraper manufactured of Knife River flint (Cat.No. 5111) recovered from arbitrary level 1 of unit 265N 192E. The expediency tools recovered from Occupation 1 consist of a retouched flake of Montana chert (Cat.No. 5201), a retouched flake fragment manufactured of feldspathic siltstone (Cat.No. 5178), and a utilized flake fragment of grey quartzite (Cat.No. 5176).

Excavation of Occupation 1 of the Main Block at site EgNo 23 also resulted in the collection of two cores ; a multidirectional core of Swan River chert (Cat.No. 5047) and an exhausted multidirectional core of grey quartzite (Cat.No. 5048). The debitage assemblage from Occupation 1 represents all stages of lithic reduction including 12 early stage flakes (10.9%), 24 second stage flakes (21.8%), 42 final stage flakes (38.2%), and 32 flake fragments / shatter (29.1%). As with the lithic tool assemblage, the debitage assemblage is dominated by locally available materials. Arenaceous

chert, feldspathic siltstone, and Knife River flint represent possible trade materials (Table 6.3).

Table 6.3 : Lithic material types represented by debitage recovered from Occupations 1 and 2; Main Block, site EgNo 23, Permit 01- 45.

MATERIAL TYPE	OCCUPATION 1		OCCUPATION 2	
	count	%	count	%
arenaceous chert	9	8.2	143	13.1
chalcedony	3	2.7	10	0.9
chert	6	5.5	17	1.6
feldspathic siltstone	1	0.9	12	1.1
miscellaneous coarse	0	0	2	0.2
miscellaneous fine	1	0.9	1	0.1
quartz	2	1.8	3	0.3
quartzite	46	41.8	393	36.1
quartzose	4	3.6	2	0.2
silicified peat	3	2.7	25	2.3
silicified siltstone	1	0.9	113	10.4
silicified wood	22	20	289	26.5
Gronlid siltstone	0	0	1	0.1
Knife River flint	3	2.7	3	0.3
Swan River chert	9	8.2	75	6.9
total	110	99.9	1089	100.1

Artifact distribution patterns from Occupation 1 reveal a higher percentage of faunal remains and firebroken rock from the northern extension of the Main Block while the east / west section of the block contains a higher percentage of lithic debitage (Figure 6.6). The seven units which constitute the northern extension of the Main Block contain a high density of faunal materials with 70.9 % (by count) of the faunal assemblage from Occupation 1 (63.1 % by weight) recovered from the relatively small area. The recovery of faunal remains, including fragments identified as *Bison bison*, from the east / west section of the block may indicate that precontact period faunal processing did not occur exclusively within the northern extension of the block or may indicate that modern agricultural activities are responsible for the redistribution of some of the faunal remains associated with Occupation 1. The distribution of firebroken rock from Occupation 1 also displays a high concentration within the site area encompassed by the northern extension of the Main Block. A total of 59.1 % (by count) or 62.6 % (by weight) of the firebroken rock assemblage was recovered from the seven units of the northern extension. In contrast, the lithic assemblage associated with Occupation 1 shows a higher distribution across the east / west section of the Main Block (Figure 6.6). The east / west section contains 82.7 %

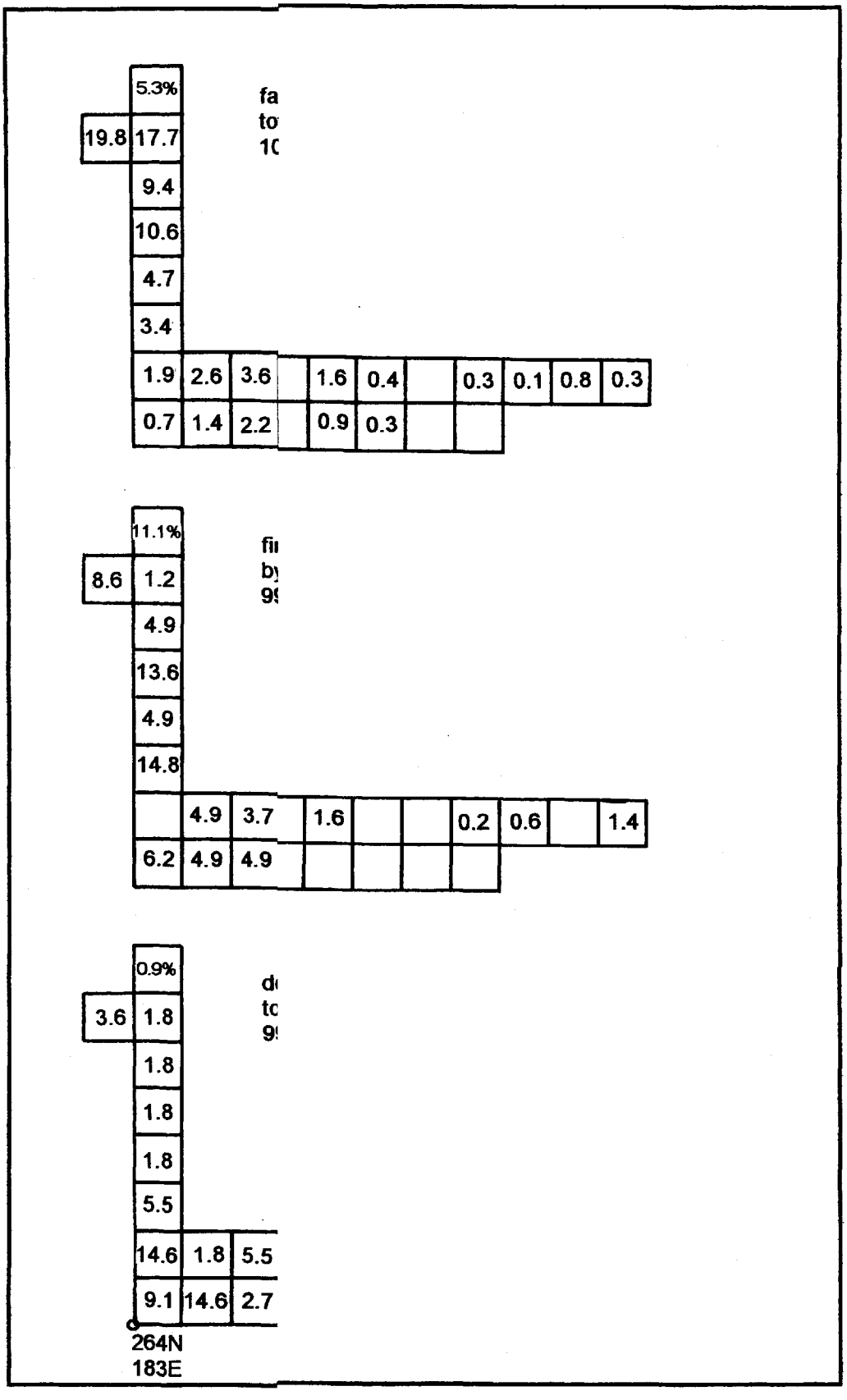


Figure 6.6 Artifact distri

of the total lithic debitage assemblage for Occupation 1 while six of the nine lithic tools and both cores were recovered from the east / west section of the Main Block.

Artifact distribution patterns suggest that while specific features were not identified, differential use of the site area during the Besant phase did occur. Patterns of artifact recovery suggest use of the northern extension of the Main Block for faunal processing while the area encompassed by the east / west section of the block was utilized for the manufacture and repair of lithic tools. Exclusive activity areas are not indicated as artifacts from all categories were collected from both the northern extension and the east / west section of the block. The recovery of Besant projectile points from both the northern extension and the east / west section of the Main Block suggests that activities conducted in each area correspond to the same period of site utilization.

6.3.2 Main Block, Occupation 2

Occupation 2, as identified during excavation of the Main Block at site EgNo 23, corresponds with the light brown silty sand layer seen in the wall profiles (Figures 6.4 and 6.5). Two faint paleosols are visible in the eastern corner of the excavation block (Figure 6.4) while a single paleosol is evident at the extreme northern end of the block (Figure 6.5). As such, Occupation 2 may represent a mixed component encompassing more that one period of site utilization. It is possible that the cultural materials recovered from Occupation 2 are associated with the paleosols visible in the wall profiles and as such may relate to two or three separate periods of dune stability indicated by paleosol development. Given the complexity of sediment deposition within sandhills and the fact that the upper paleosols can not be correlated across the excavation block, the cultural materials found within the light brown silty sand layer are discussed as a single occupation. The arbitrary excavation levels within the light brown silty sand layer of Occupation 2 include level 2 in six units (units 264N 192E, 196E, 197E and 265N 192E, 196E, 197E), level 3 in 39 units (unit 271N 183E excluded), level 4 in 22 units (units 264N 190 to 197E, 265N 190 to 200E, 270N 182 and 183E, 271N 183E), level 5 in 10 units (units 264N 195 to 197E, 265N 195 to 200E, and 271N 183E), and level 6 in a single unit (271N 183E). Occupation 2 can be assigned to the Pelican Lake phase based on the recovery of a Pelican Lake projectile point fragment and radiocarbon dating of faunal materials recovered during

excavation. Occupation 2 corresponds with cultural zone 1 and the sand layer between zone 1 and zone 2 as discussed in Webster's dissertation (2004).

Occupation 2 is represented by a relatively dense scattering of artifacts recovered across the Main Block with only two units proving sterile of cultural materials (unit 264N 189E and 264N 193E). Excavation resulted in the identification of a lithic workshop and a bison kill / butchery event associated with Occupation 2. The lithic workshop was identified in arbitrary level 3 of unit 264N 184E and was mapped in association with a typical occupational living floor (Figure 6.7). The lithic workshop consists of a debitage concentration which was collected for fine screening and the unit as a whole contains 84.7% of the total debitage assemblage from Occupation 2. Excavation of unit 264N 184E resulted in the recovery of 215 pieces of lithic debitage (19.7% of total assemblage) while 82 fragments (7.5% of total assemblage) were recovered from the lithic concentration directly during excavation. Fine screening of the lithic concentration matrix resulted in the recovery of an addition 625 pieces of debitage which comprises 57.4% of the total debitage assemblage associated with Occupation 2 as a whole. The lithic workshop contains flakes from all stages of reduction including 12 early stages flakes (30.8% of all early stage flakes), 34 second stage flakes (48.6% of all second stage flakes), 252 final stage flakes (88.7% of all final stage flakes), and 367 flake fragments / shatter (89.9% of all flake fragments / shatter). The activity area also contains debitage from nine of the 15 lithic material types recovered from Occupation 2, representing a concentration of both material types and reduction stages (Table 6.4). The workshop contains the majority of the final reduction stage flakes and flake fragments / shatter from the occupation and more than 50% of all debitage from eight of the 15 lithic material types identified in Occupation 2. As such, unit 264N 184E contains the majority of all lithic reduction stages and material types identified in Occupation 2. Unit 264N 184E also contains a retouched flake of Swan River chert (Cat.No. 5145), two retouched flake fragments (Cat.No. 5147 of silicified wood and Cat.No. 5148 of grey quartzite), and two utilized flake fragments (Cat.No. 5144 of black silicified siltstone and Cat.No. 5146 of grey quartzite). The remainder of the occupation floor displays a typical scattering of debitage, firebroken rock, and faunal specimens (Figure 6.7). The mapped units also contained two projectile point fragments (Cat.No. 5069 and 5074), a biface fragment (Cat.No. 5079), two retouched flakes (Cat.No. 5150 of Swan River chert and Cat.No.

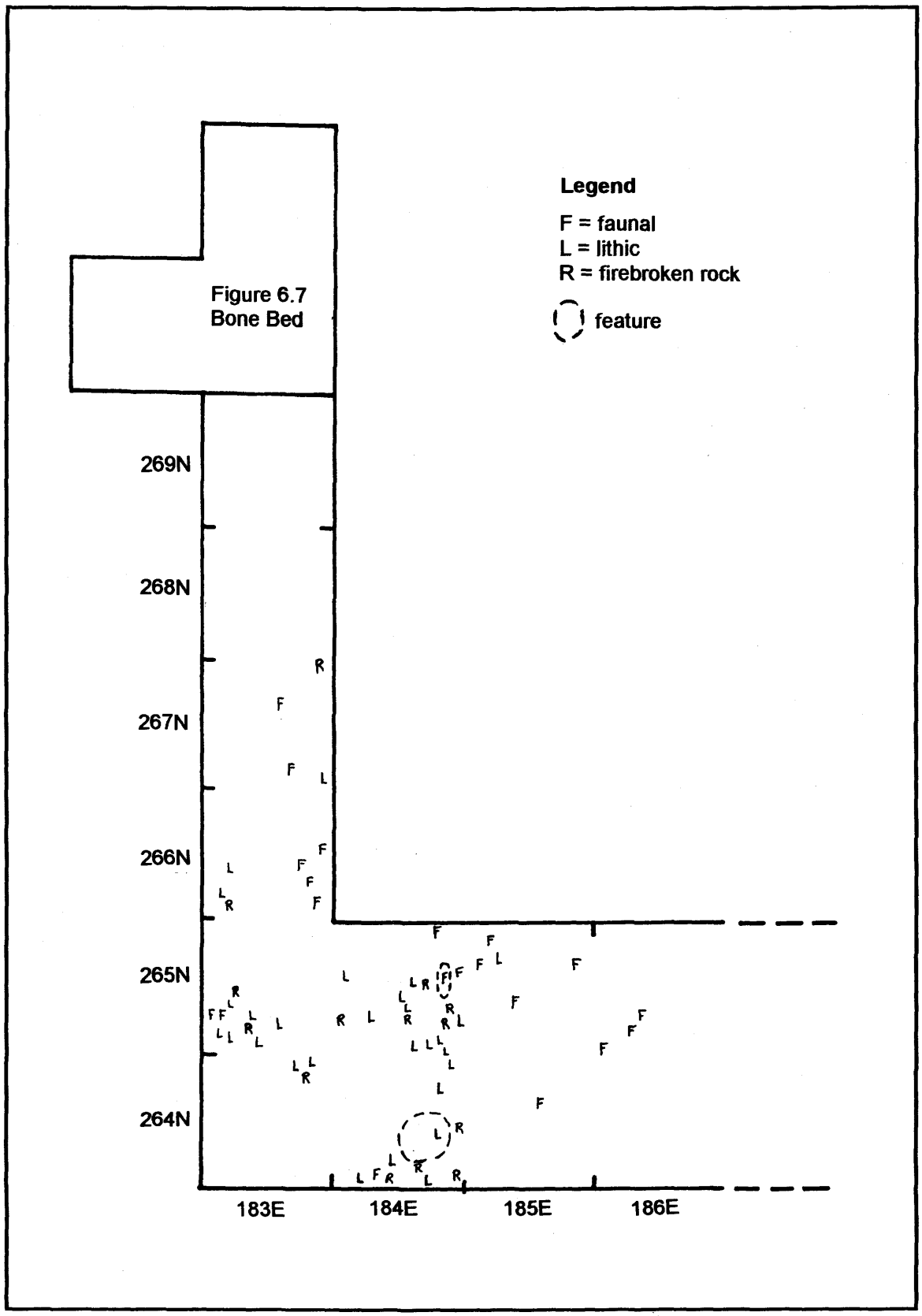


Figure 6.7 Planview of Occupation 2, Main Block, site EgNo 23.

5177 of black chert), and a utilized flake of silicified wood (Cat.No. 5151) which were not recovered *in situ* . The lithic tools are discussed in more detail below in conjunction with the occupation as a whole.

Table 6.4 : Lithic material types and reduction stages represented by debitage recovered from lithic workshop, Occupation 2, Main Block, site EgNo 23, Permit 01- 45.

	unit	concentration	fine screening	% of total
early stage	10	1	1	30.8
second stage	26	3	5	48.6
final stage	87	46	252	88.7
flake frag/shatter	92	32	367	89.9
arenaceous chert	35	7	81	86.0
chalcedony	2	0	3	50.0
chert	3	0	5	47.1
feldspathic siltstone	3	1	7	91.7
quartzite	75	38	244	90.8
silicified peat	17	4	0	84.0
silicified siltstone	26	8	57	80.5
silicified wood	54	17	187	89.3
Swan River chert	0	7	41	64.0

The bison bone bed associated with Occupation 2 was identified at the end of the excavation season and, therefore, only four units containing evidence of the bone bed were excavated (Figure 6.7 and 6.8). Two of the four bone bed units were completed during the 2000 field season, however, the loss of the season's level records meant that the bone bed was not 'rediscovered' until the end of the 2001 season when excavation tied into the northern units. Units 269N 183E, 270N 182E, 270N 183E, and 271N 183E comprise the excavated portion of the Pelican Lake phase bone bed at site EgNo 23. A total of 3537 faunal specimens weighing 8795.1 grams were recovered from the four units which comprises 76.9% of the total faunal assemblage for Occupation 2 by count and 92.1% of the total assemblage by weight. The bone bed also contains 309 of the 321 faunal fragments identified as *Bison bison* from the occupation as a whole. As such, the bone bed contains 96.3% of the total identifiable bison assemblage by count and 96.4% of the assemblage by weight (4808.8 gm of a total of 4990.0 gm).

While the bone bed contained a relatively small sample of identifiable bison elements, information regarding herd composition could be discerned. Detailed

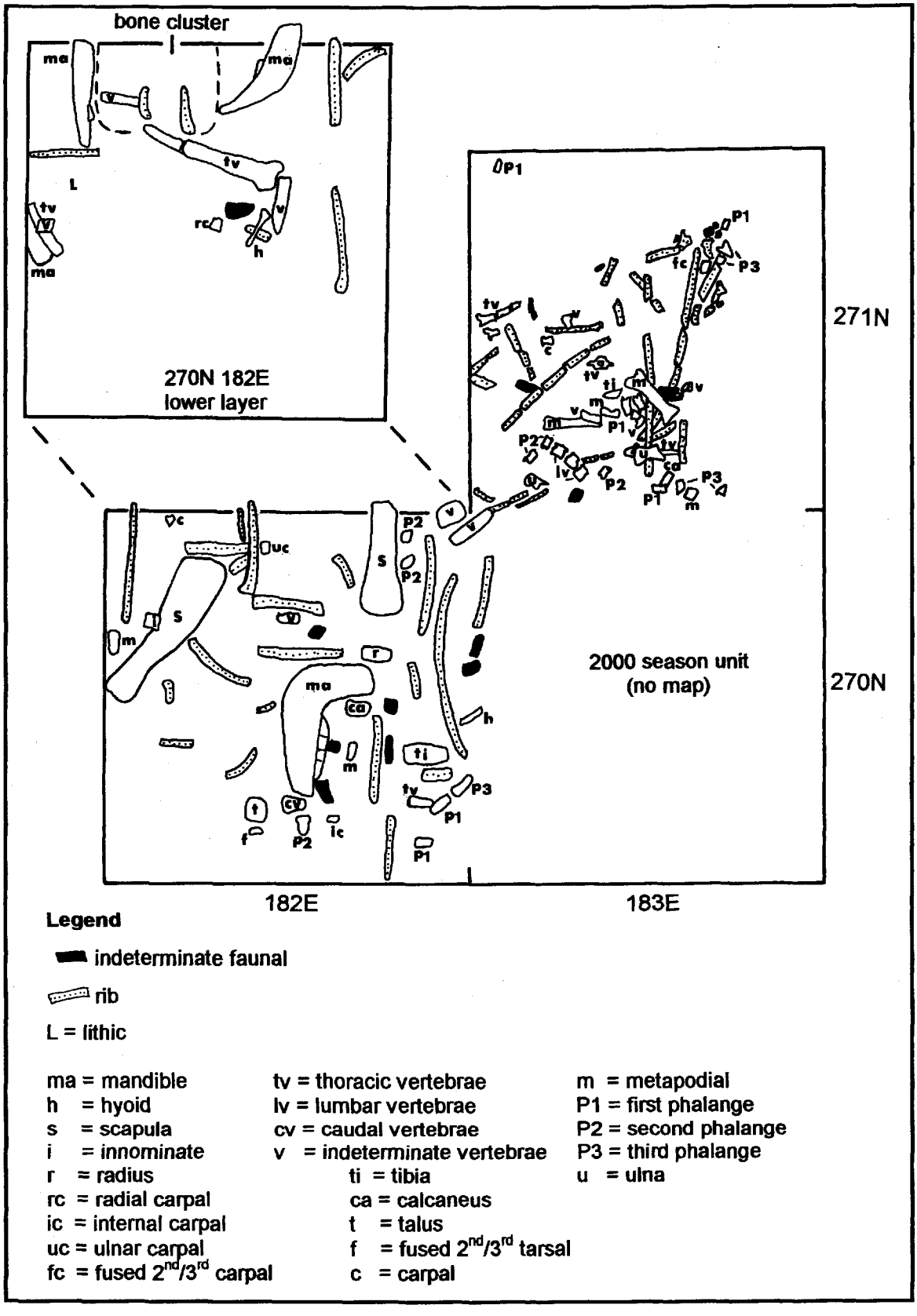


Figure 6.8 Bone bed associated with Occupation 2, Main Block, site EgNo 23.

analysis of the bison specimens which could be assigned as to element and side was conducted in an attempt to determine the gender and age of the animal. Complete carpals and tarsals were measured according to Morlan (1991), first and second phalanges were analyzed according to Duffield (1973), the fragmentary limb elements were classified based on Speth (1983) and Todd (1987) while the mandibles were assessed based on Frison (1982). Seasonality of the bison kill event could not be determined as neither fetal bison bone nor young animals were recovered from the portion of the bone bed excavated. The bison bone displays fracture patterns and butchering marks consistent with primary and secondary butchering as carcasses were disarticulated and skinned, meat stripped from the bone, marrow extracted from cavities, and bone crushed for grease extraction. The degree of bone preservation displayed by the bone bed was relatively high, however, some elements exhibited weathering which hampered assessment as to gender and age (Table 6.5). A discrepancy in gender classification was noted during analysis of the complete first phalanges recovered from the bone bed. Classification based on the ratios used by Duffield (1973) place three of the four elements within the range of adult males while the same elements fall within the size range of adult females according to Zeimens (1982). Rates of epiphyseal fusion have been determined for modern European bison, however, the rates do not appear to correspond with North American bison and therefore can not be confidently used to determine the age of archaeological materials recovered from the Plains (Zeimens 1982). As such the unfused distal tibia epiphysis, the unfused first phalanx, the unfused second phalanx, and the partially fused second phalanx can simply be classified as immature animals (Table 6.5). Damage to the occlusal surfaces of the teeth from the three near complete mandibles precluded measurements of metaconid height, therefore, none of the mandibles could be assigned to a specific age group. The mandibles recovered from the bone bed represent mature animals as all teeth have erupted and show evidence of wear but lacking metaconid measurements a more definitive age classification is not possible (Table 6.5). The teeth show early stages of wear and, therefore, the mandibles most probably represent young adult bison. General observation of appearance and size suggests that two of the mandible fragments may be from a single animal (Cat.No. 17891 and 17892). On the basis of the classification of the second phalanges recovered from the bone bed a minimum of four animals are represented, assuming

Table 6.5 : Summary of bison elements recovered from bone bed, Occupation 2, Main Block, site EgNo 23, Permit 01-45.

Group / Element	CatNo	Side	Gender	Age	MNI
Axial					
maxillary premolar					1
P2	16708	right	n/a	n/a	
P2	17881	right	n/a	n/a	
P2	17848	left	n/a	n/a	
deciduous P4	16699	right	n/a	n/a	
maxillary molar					1
M1	16700	right	n/a	n/a	
M2	16701	right	n/a	n/a	
mandibular incisor	16534	right	n/a	n/a	3
mandibular incisor	16551	right	n/a	n/a	
mandibular incisor	16578	right	n/a	n/a	
mandibular incisor	16592	right	n/a	n/a	
mandibular incisor	16593	right	n/a	n/a	
mandibular incisor	17705	right	n/a	n/a	
mandibular incisor	17883	right	n/a	n/a	
mandibular canine	17808	right	n/a	n/a	2
mandibular canine	17882	right	n/a	n/a	
mandibular premolar					2
P2	16553	right	n/a	n/a	
P2	16620	right	n/a	n/a	
P2	17849	right	n/a	n/a	
P2	17880	right	n/a	n/a	
P2	17847	left	n/a	n/a	
P2/P3	17700	right	n/a	n/a	
deciduous P4	17895	left	n/a	n/a	
mandibular molar					1
M1	16552	right	n/a	n/a	
M1/M2	17896	right	n/a	n/a	
M3	16546	right	n/a	n/a	
indeterminate molar	17775	right	n/a	n/a	1
mandible					2
near complete	17891	right	n/a	3.5 - 7	
near complete	17892	left	n/a	3.5 - 7	
midsection	17893	left	n/a	3.5 - 7	
coronoid process	16545	right	n/a	n/a	
hyoid					1
proximal frag	17856	left	n/a	n/a	
rib					1
neck frag	16711	left	n/a	n/a	

Table 6.5 : Summary of bison elements recovered from bone bed continued.

Group / Element	CatNo	Side	Gender	Age	MNI
Axial					
cervical vertebrae	16558	n/a	n/a	n/a	1
cervical vertebrae	16697	n/a	n/a	n/a	
thoracic vertebrae	16562	n/a	n/a	n/a	2
thoracic vertebrae	16572	n/a	n/a	n/a	
thoracic vertebrae	17715	n/a	n/a	n/a	
thoracic vertebrae	17716	n/a	n/a	n/a	
thoracic vertebrae	17730	n/a	n/a	n/a	
thoracic vertebrae	17739	n/a	n/a	n/a	
thoracic vertebrae	17753	n/a	n/a	n/a	
thoracic vertebrae	17755	n/a	n/a	n/a	
thoracic vertebrae	17757	n/a	n/a	n/a	
thoracic vertebrae	17758	n/a	n/a	n/a	
thoracic vertebrae	17780	n/a	n/a	n/a	
thoracic vertebrae	17840	n/a	n/a	n/a	
thoracic vertebrae	17841	n/a	n/a	n/a	
thoracic vertebrae	17863	n/a	n/a	n/a	
thoracic vertebrae	17864	n/a	n/a	n/a	
thoracic vertebrae	17872	n/a	n/a	n/a	
thoracic vertebrae	17874	n/a	n/a	n/a	
thoracic vertebrae	17878	n/a	n/a	n/a	
T14	17760	n/a	n/a	n/a	
T15	17761	n/a	n/a	n/a	
lumbar vertebrae	16561	n/a	n/a	n/a	2
lumbar vertebrae	16564	n/a	n/a	n/a	
lumbar vertebrae	17737	n/a	n/a	n/a	
lumbar vertebrae	17738	n/a	n/a	n/a	
lumbar vertebrae	17762	n/a	n/a	n/a	
lumbar vertebrae	17763	n/a	n/a	n/a	
lumbar vertebrae	17764	n/a	n/a	n/a	
L1	17759	n/a	n/a	n/a	
L5	17735	n/a	n/a	n/a	
caudal vertebrae	16531	n/a	n/a	n/a	1
caudal vertebrae	17860	n/a	n/a	n/a	

Table 6.5 : Summary of bison elements recovered from bone bed continued.

Group / Element	CatNo	Side	Gender	Age	MNI
Forelimb					
scapula					1
proximal frag	17862	left	n/a	n/a	
blade frag	17861	right	n/a	n/a	
radius					1
distal epiphysis	17858	left	n/a	n/a	
ulna					1
proximal frag	17709	left	n/a	n/a	
radial carpal	16537	left	male	adult	2
radial carpal	17744	left	male/female	cow/calf	
internal carpal	17816	right	male/female	cow/calf	1
ulnar carpal	16538	left	male	adult	2
ulnar carpal	17850	left	male/female	cow/calf *	
fused 2nd/3rd carpal	16536	left	male	adult	3
fused 2nd/3rd carpal	16709	left	male/female	cow/calf	
fused 2nd/3rd carpal	17720	left	male/female	cow/calf	
unciform carpal	16710	left	male	adult	2
unciform carpal	17851	left	male/female	cow/calf *	
metacarpal					1
proximal frag	16523	right	n/a	n/a	
complete (C14 sample)	17714	left	n/a	n/a	
Hindlimb					
pelvis					1
ilium acetabulum	17901	right	n/a	n/a	
ilium midshaft	16609	right	n/a	n/a	
tibia					2
distal frag	17809	right	female	cow/calf	
distal epiphysis	17747	right	n/a	unfused/calf	
distal frag	16619	left	n/a	n/a	
calcaneus					1
near complete	17711	right	n/a	n/a	
proximal frag	17899	left	n/a	n/a	
fused central/4th tarsal	17773	right	n/a	n/a	1
				* upper range	

Table 6.5 : Summary of bison elements recovered from bone bed continued.

Group / Element	CatNo	Side	Gender	Age	MNI
Hindlimb con't					
talus	16563	left	male/female	cow/calf *	1
fused 2nd/3rd tarsal					2
complete	17782	right	male/female	cow/calf	
near complete	17859	left	n/a	n/a	
near complete	17897	left	n/a	n/a	
metatarsal					1
near complete	17748	right	female	cow/calf	
Other Appendicular					
1st phalanx					3
complete, unfused	17710	right	n/a	calf	
complete, anterior	17740	right	male	adult	
complete, anterior	17736	left	male	adult	
complete, anterior	17821	left	male	adult	
complete, posterior	16560	left	female	adult	
distal frag	17900	right	n/a	n/a	
2nd phalanx					4
near complete, unfused	17854	left	n/a	calf	
near complete, partially fused	17855	left	n/a	calf	
complete, anterior	16602	right	n/a	cow/calf	
complete, anterior	17712	right	n/a	cow/calf	
complete, anterior	17774	left	female	adult	
complete, posterior	16559	right	n/a	cow/calf	
complete, posterior	16603	right	n/a	cow/calf	
near complete	16604	right	n/a	n/a	
near complete	17745	right	n/a	n/a	
near complete	17741	left	n/a	n/a	
medial frag	17853	left	n/a	n/a	
distal frag	16731	right	n/a	n/a	
3rd phalanx					2
complete	17724	right	n/a	n/a	
proximal frag	16599	right	n/a	n/a	
distal frag	17707	right	n/a	n/a	
complete	16582	left	n/a	n/a	
complete	17722	left	n/a	n/a	
complete	17746	left	n/a	n/a	
complete	17815	left	n/a	n/a	
				* upper range	

that the partially fused second phalanx (Cat.No. 17855) and unfused second phalanx (Cat.No. 17854) belong to two different immature bison. Analysis of the other elements suggests the presence of at least one adult male, one adult female, and one immature animal of indeterminate gender (Table 6.5).

Occupation 2 as a whole contains the typical array of cultural materials discarded during campsite activities. Excavation of the Main Block at site EgNo 23 resulted in the recovery of a total of 4536 fragments of faunal remains weighing 9555.4 grams. The assemblage is dominated by indeterminate bone and tooth enamel fragments including 3629 unaltered fragments (2105.8 gm), 36 burned fragments (12.2 gm), and 27 calcined fragments (9.9 gm). Burned and calcined fragments were collected from across the entire excavation block and do not provide evidence of specialized features such as boiling pits or hearths. The faunal assemblage from Occupation 2 also includes other identifiable specimens which were classified as to species and element including four cranial elements (1.3 gm) classified as *Thomomys talpoides* (northern pocket gopher). A single, near complete talus (0.4 gm) categorized as *Lepus townsendii* (white-tailed jackrabbit) was also recovered and while the *Thomomys talpoides* specimens represent intrusive elements, the *Lepus townsendii* element may represent an additional resource utilized by the precontact inhabitants of the site. A total of 518 faunal specimens weighing 2435.8 grams could be identified as to order, namely as Artiodactyla, and probably represent fragments of bison bone lacking landmarks necessary to classify as to specific element and species. Fragmentary elements identified as Artiodactyla include incomplete cranial pieces, mandibles, molars, ribs, vertebrae, scapula, tibia, metapodial, and indeterminate long bone fragments. As discussed above, the faunal assemblage from Occupation 2 includes 321 specimens identified as *Bison bison* with the majority of the collection recovered from the bone bed located in the northern end of the Main Block. Table 6.6 lists all elements classified as *Bison bison* recovered from the occupation as a whole while Table 6.5 lists the bison elements recovered from the bone bed which could be assigned as to side, gender, and/or age. In addition to the bone bed elements, seven identifiable bison elements (in 12 pieces) were collected from the remainder of the occupation. A single right mandibular M2, the proximal end of a right second phalanx, two nearly complete right second phalanges, and the distal fragment of a right humerus were collected from outside of

the bone bed but the elements were too damaged to identify as to gender and/or age. The distal humerus (Cat.No. 17658) collected from unit 267N 183E displays evidence of heavy hammerstone butchering identical to patterns identified at the Agate Basin site (Zeimens 1982:221).

Table 6.6 : Summary of bison elements recovered from Occupation 2, Main Block, site EgNo 23, Permit 01- 45.

Group / Element	Count	Weight (gm)	Group / Element	Count	Weight (gm)
Axial			**Hindlimb**		
cranium	19	122.1	pelvis	2	58.0
mandible	81	1506.7	tibia	12	188.3
molar	6	15.4	calcaneus	3	67.4
hyoid	5	9.0	fused central/4th tarsal	1	27.1
cervical vertebrae	3	12.4	talus	4	107.7
thoracic vertebrae	67	692.2	fused 2nd/3rd tarsal	3	11.2
lumbar vertebrae	13	153.6	metatarsal	7	140.8
caudal vertebrae	2	20.0			
indeterminate vertebrae	6	26.7	**Other Appendicular**		
rib	3	19.5	metapodial	6	98.4
			1st phalanx	9	158.7
Forelimb			2nd phalanx	17	218.8
scapula	25	550.4	3rd phalanx	10	111.4
humerus	1	74.6			
radius	1	14.8			
ulna	1	75.4			
radial carpal	3	55.3			
internal carpal	1	14.9			
ulnar carpal	2	38.1			
fused 2nd/3rd carpal	3	59.9			
unciform carpal	2	34.0			
metacarpal	3	307.2	**total**	**321**	**4990.0**

Excavation of Occupation 2 at site EgNo 23 resulted in the recovery of 110 fragments of firebroken rock weighing a total of 945.0 grams. This assemblage is dominated by miscellaneous coarse grained material fragments including 92 pieces belonging to the 0-5 centimeter size category (356.9 gm) and three fragments from the 5-10 centimeter size category (328.6 gm). Also collected during excavation were 14 hard cobble / quartzite firebroken rock fragments belonging to the 0-5 centimeter size category (207.1 gm) and a single fragment from the 5-10 centimeter size category (52.4 gm).

The lithic assemblage from Occupation 2 at site EgNo 23 consists of nine finished tools, 12 expediency tools, and 1089 pieces of debitage. A broken Pelican

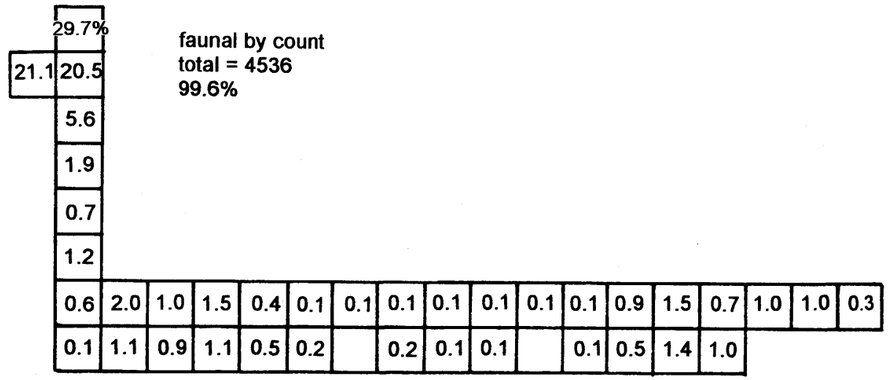
Lake projectile point (Cat.No. 5067) was recovered from arbitrary level 5 of unit 265N 199E providing a relative date for the occupation. The well finished projectile point fragment is missing the tip and a portion of the upper body, as well as being snapped through the stem. The projectile point retains the distinctive barbs and triangular body shape of typical Pelican Lake points and was manufactured of brown chert. An additional two projectile point fragments were collected from Occupation 2, but the tool fragments lack distinctive characteristics which would allow assignment to a specific archaeological culture. A moderately finished body / base fragment manufactured of Swan River chert (Cat.No. 5069) and a tip / body fragment also of Swan River chert (Cat.No. 5074) were collected from arbitrary level 3 of unit 267N 183E. General dimensions of the projectile point fragments indicate that the pieces do not belong to a single tool. The body / base fragment displays the broad, shallow side notches characteristic of Besant projectile points and may represent an intrusive artifact from the upper occupation of the site. A complete, well finished biface manufactured of silicified wood (Cat.No. 1479) was collected from the bone bed at the northern end of the excavation block. This triangular biface was recovered from arbitrary level 3 of unit 270N 183E. A second biface fragment was collected from arbitrary level 3 of unit 265N 186E. The tip / body fragment manufactured of Montana chert (Cat.No. 5079) was well finished but appears to have broken along a flaw in the material. A single scraper fragment (Cat.No. 1481) was recovered during excavation of Occupation 2. The well finished proximal fragment manufactured of Knife River flint was collected from arbitrary level 4 of unit 270N 183E and, therefore, is associated with the bone bed. The remaining finished tools consist of a spokeshave manufactured of Knife River flint (Cat.No. 5135), a wedge of Swan River chert (Cat.No. 5124), and a uniface of Knife River flint (Cat.No. 5142) which appears to have served as a scraper, perforator, and spokeshave. The spokeshave was recovered from arbitrary level 2 of unit 264N 197E, the wedge from arbitrary level 2 of unit 265N 192E, and the uniface from arbitrary level 5 of unit 265N 196E.

The expediency tools collected from Occupation 2 at the Main Block of site EgNo 23 includes three retouched flakes of Swan River chert (Cat.No. 5145 and 5150) and black chert (Cat.No. 5177), and six retouched flake fragments. The retouched flake fragments are manufactured of grey chert (Cat.No. 1103), red chert (Cat.No. 1484), grey quartzite (Cat.No. 5148), silicified wood (Cat.No. 5147), and

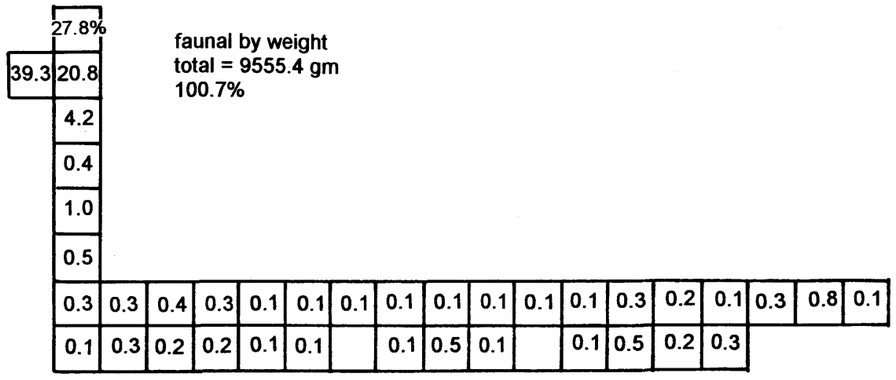
Knife River flint (Cat.No. 5157 and 5168). A single utilized flake of silicified wood (Cat.No. 5151), and a utilized flake fragment of grey quartzite (Cat.No. 5146) and of black silicified siltstone (Cat.No. 5144) were also collected from Occupation 2. Five of the 12 expediency tools were collected from the lithic workshop identified in the southwest corner of the Main Block (Figure 6.7) including a retouched flake (Cat.No. 5145), two retouched flake fragments (Cat.No. 5147 and 5148), and two utilized flake fragments (Cat.No. 5144 and 5146). Also recovered from Occupation 2 at the Main Block was a historic brass cartridge casing (Cat.No. 5139). The center fire shotgun shell casing was collected from arbitrary level 3 of unit 265N 199E. The casing is embossed "DOMINION No 12 REGAL' and still retains its paper wadding therefore likely represents an intrusive, modern artifact.

The lithic debitage assemblage associated with Occupation 2 includes flakes from all stages of lithic reduction including 39 early stage (3.6%), 70 second stage flakes (6.4%), 434 final stage (39.9%), and 546 flake fragments / shatter (50.1%). The majority of the lithic assemblage was recovered from a lithic workshop identified in the southwest corner of the Main Block (Figure 6.7). The predominance of final stage flakes and flake fragments / shatter relates to the fine screening of the matrix of the lithic workshop discussed above (Table 6.4). The lithic assemblage recovered from the workshop contains a full range of lithic materials, as does the remainder of the occupation floor. The array of materials and reduction stages suggests that the assemblage relates to multiple lithic activities, not simply the repair or manufacture of a single artifact. The lithic assemblage is dominated by locally available material (Table 6.3) with arenaceous chert, feldspathic siltstone, and Knife River flint representing possible trade materials.

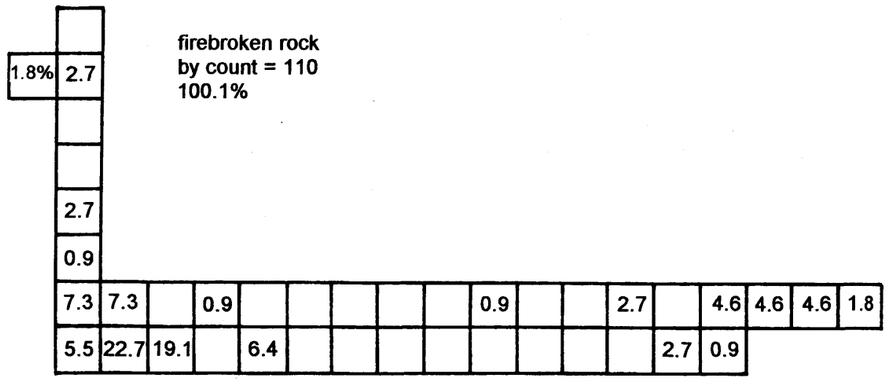
Artifact distribution patterns reinforce the identification of specific activity areas associated with Occupation 2 at site EgNo 23. In addition to the identifiable bison elements mapped within the bone bed (Figure 6.8), faunal distribution patterns display a predominance of faunal specimens in the four units associated with the feature (Figure 6.9). Likewise, lithic debitage distribution patterns (Figure 6.9) demonstrate the concentration of materials within the unit containing the mapped workshop (Figure 6.7). The distribution of firebroken rock across the Main Block displays different patterning. Clusters of firebroken rock correspond with the identified features, namely



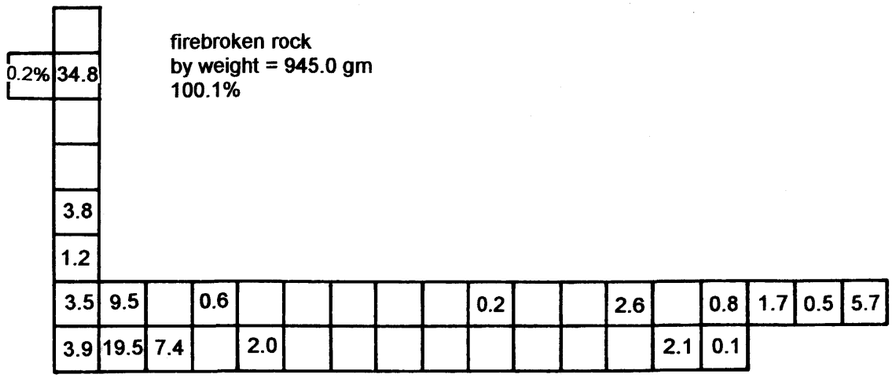
faunal by count
total = 4536
99.6%



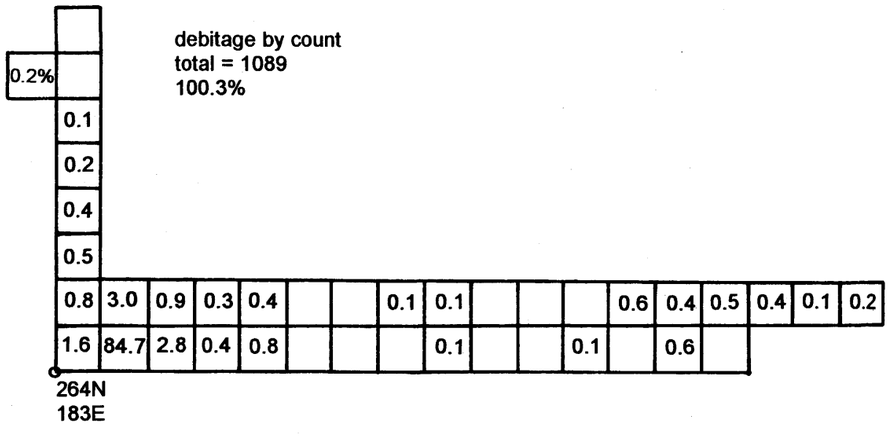
faunal by weight
total = 9555.4 gm
100.7%



firebroken rock
by count = 110
100.1%



firebroken rock
by weight = 945.0 gm
100.1%



debitage by count
total = 1089
100.3%

Figure 6.9 Artifact distribution maps, Occupation 2, Main Block, site EgNo 23.

the bone bed and the lithic workshop, while a third concentration is noted at the extreme eastern end of the block (Figure 6.9). However, the concentration of firebroken rock associated with the bone bed in Occupation 2 may actually relate to the firebroken rock feature from the underlying McKean feature (Webster 2004).

Occupation 2, as identified in the Main Block at site EgNo 23, has been dated to the Pelican Lake archaeological time period based on the recovery of a broken projectile point (Cat.No. 5067). A complete left metacarpal (Cat.No. 17714) collected *in situ* from the bone bed was submitted to Brock University to refine the time frame of site utilization. The radiocarbon sample produced a date of 1880 ± 50 years BP (BGS # 2365, UofS 23-3) which corresponds to the uppermost range of radiometric dates obtained from Pelican Lake sites in Saskatchewan (Dyck 1997). While the identification of an intact living floor (Figure 6.7) and a portion of a substantive bone bed (Figure 6.8) speak to the integrity of the occupation, the complex stratigraphy of the site suggests that some mixing of cultural components may have occurred. The presence of multiple, though ephemeral paleosols, as seen in wall profiles (Figure 6.4 and 6.5) suggests that dune stability occurred at numerous times throughout the archaeological record of the site. The recovery of a modern shotgun cartridge case (Cat.No. 5139) from Occupation 2 indicates that bioturbation and modern agricultural activities have impacted portions of both Occupation 1 and Occupation 2. Evidence of possible mixing of cultural components is also suggested by the recovery of a possible Besant projectile point fragment (Cat.No. 5069) from Occupation 2, and the collection of a possible Besant projectile point fragment (Cat.No. 5063) and two possible Pelican Lake projectile point fragments (Cat.No. 5078 and 1480) from the basal McKean Series occupations of site EgNo 23. Mixing of cultural materials may also account for the questions which arise from the radiocarbon date obtained from Occupation 2. The radiocarbon date of 1880 ± 50 years BP corresponds with dates from the Pelican Lake phase but overlaps the range of dates obtained from Besant sites within Saskatchewan (Dyck 1997).

6.4 Summary of All Cultural Occupations Identified at site EgNo 23

Archaeological investigation at site EgNo 23 includes five seasons of surface collection, monitoring, testing, and controlled excavation. Intensive archaeological focus on the site followed the identification of a McKean Series bison kill event dating

during monitoring of the Alliance Pipeline Limited (Calgary) gas pipeline project in the summer of 1999. This relatively unique archaeological find prompted two additional seasons of testing and controlled excavation. The 2000 field season was designed to determine the horizontal and vertical extent of the site and to clarify the time frame of site utilization. Auger testing and the controlled excavation of 1m x 1m units on both sides of the pipeline corridor provided evidence of repeated precontact utilization of the sandhills area. Auger testing produced cultural materials associated with typical campsite activities but failed to produce time diagnostic artifacts. The 1m x 1m excavation units revealed multiple occupations of site EgNo 23 and, in addition to materials associated with typical campsite activities, four of the units contained time diagnostic artifacts. Unit 267N 194E produced a Hanna projectile point (Cat.No. 1474), however, time constraints did not allow for expansion of the unit during the 2001 field season. The remaining units containing time diagnostic artifacts, namely a Besant projectile point (Cat.No. 1490), a possible Pelican Lake point (Cat.No. 1480), and a Hanna point (Cat.No. 1485), were expanded upon creating the Main Excavation Block of the 2001 season.

The 2001 field season involved controlled excavation in two distinct areas of the site. Block 2 was placed near the location of the McKean Series bone bed in the eastern section of the site. A degree of cultural component mixing due to pipeline construction and recent agricultural activities was noted, as was disturbance due to natural processes including bioturbation and the nature of sediment deposition within sandhills. However, cultural materials were recovered in relative intact buried contexts. Four periods of precontact habitation of the site were identified although none of the interpretive units produced time diagnostic artifacts. A light scattering of faunal materials, firebroken rock, and lithic debitage typical of precontact period campsite activities was recovered from Interpretive Unit 2 of Block 2. Interpretive Unit 3 contained more substantive evidence of precontact utilization of site EgNo 23 including faunal materials, firebroken rock, lithic debitage, cores, and lithic tools (3 wedges, 2 expediency tools). Interpretive Unit 4 revealed a light scattering of faunal material, firebroken rock, lithic debitage, and a single expediency tool, however, wall profiles suggest some disturbance of the sediments associated with the interpretive unit. An extremely light scattering of faunal materials, lithic debitage and a single expediency tool comprise Interpretive Unit 6 which may represent the edge of an

additional occupation floor at Block 2. All interpretive units identified in Block 2 have been discussed in detail in section 6.2 of this chapter.

The Main Block at site EgNo 23 contains multiple buried occupations which produced time diagnostic artifacts and faunal samples suitable for radiocarbon dating. Occupation 1 dates to the Besant phase based on the recovery of three Besant projectile points. Cultural materials indicative of precontact campsite activities were collected including faunal material, firebroken rock, lithic debitage, cores, and lithic tools (3 projectile points, 3 scrapers, 3 expediency tools). No specific activity areas were identified during excavation but distribution patterns suggest that the northern portion of the block was used for faunal processing while the east / west section of the block was used for the manufacture and repair of lithic artifacts. Besant projectile points were recovered from both sections of the Main Block tentatively correlating the activity areas. Occupation 2 dates to the Pelican Lake phase based on the recovery of a broken projectile point and a radiocarbon date of 1880 ± 50 BP obtained from the bison bone bed identified in the northern portion of the excavation block. The bone bed contains evidence of the butchering and processing of possibly four animal, or of at least one adult male, one adult female, and one immature animal of indeterminate gender. Excavation during the 2000 and 2001 seasons exposed just a portion of the bone bed and, unfortunately, information regarding seasonality of the kill event was not recovered. A lithic workshop was also identified during excavation of Occupation 2 in the southwest section of the Main Block. Occupation 2 contains a dense scattering of cultural materials including faunal material, firebroken rock, lithic debitage, and lithic tools (3 projectile points, 2 bifaces, 1 scraper fragment, 1 spokeshave, 1 wedge, 1 uniface, 12 expediency tools). Occupations 1 and 2 have been discussed in detail in section 6.3 of this chapter.

Excavation of the Main Block at site EgNo 23 also resulted in the identification of multiple buried occupations associated with the McKean Series. The McKean occupations are associated with a series of paleosols as seen in wall profiles (Figure 6.4 and 6.5) and are discussed in detail in a recent dissertation (Webster 2004). A detailed description of the lithic tools recovered from the McKean Series occupations is included in Appendix B. Cultural level 2 contained evidence of typical campsite activities including a possible boiling pit and a lithic workshop. Cultural material

recovered from the occupation consists of faunal materials (n=2050, 1684.0 gm), firebroken rock (n=425, 7568.1 gm), lithic debitage (n=2327), and lithic tools (2 projectile points, 6 bifaces, 1 wedge, 1 uniface, 13 expediency tools). Among the lithic tools recovered from cultural level 2 was the possible Pelican Lake projectile point (Cat.No. 1480) discussed in section 6.3.2 and a reworked Hanna point (Cat.No. 1485). Cultural level 2a revealed a possible hearth in association with cultural materials indicative of precontact campsite activities. Faunal material (n=1602, 1918.8 gm), firebroken rock (n=248, 3185.8 gm), lithic debitage (n=300), cores (n=2), and lithic tools (2 projectile points, 3 bifaces, 1 scraper, 2 wedges, 1 uniface, 4 expediency tools) were collected in association with cultural level 2a. The Duncan / Hanna projectile points (Cat.No. 1474 and 5068) provide a relative date for the occupation. Cultural level 2b contained a relatively dense scattering of cultural materials including faunal material (n=596, 1120.6 gm), firebroken rock (n=66, 1879.9 gm), lithic debitage (n=259), and lithic tools (1 scraper, 1 wedge, 4 expediency tools). Cultural level 3 in the Main Block at site EgNo 23 also revealed a possible hearth in association with typical campsite debris. Faunal material (n=1473, 3063.3 gm), firebroken rock (n=475, 8143.0 gm), lithic debitage (n=452), cores (n=10) and lithic tools (2 projectile points, 7 bifaces, 5 scrapers, 5 wedges, 2 spokeshaves, 2 perforators, 1 hammerstone, 20 expediency tools) were collected from cultural level 3. Among the lithic tools recovered from cultural level 3 was a reworked McKean lanceolate projectile point (Cat.No. 5065) and a broken flake point (Cat.No. 5063).

The final occupation of site EgNo 23, as identified during excavation of the Main Block, is associated with the light brown sandy silt and basal whitish tan sandy clay layers seen in wall profiles (Figure 6.4 and 6.5). Cultural level 4 contains a total of 167 faunal specimens weighing 197.6 grams including 129 fragments of unaltered indeterminate bone and tooth enamel (55.1 gm), 16 burned indeterminate bone and tooth enamel fragments (4.7 gm), and 12 calcined indeterminate bone and tooth enamel fragments (1.9 gm). The faunal assemblage also includes a tibia fragment (10.7 gm), three metatarsal fragments (101.8 gm), and six first phalanx fragments (23.4 gm) which have been classified as *Bison bison*. Excavation of cultural level 4 resulted in the recovery of a total of 114 fragments of firebroken rock. The assemblage includes fragments of miscellaneous coarse grained material firebroken rock consisting of 91 pieces (311.7 gm) belonging to the 0-5 centimeter size category,

four pieces (352.6 gm) from the 5-10 centimeter size category, 3 pieces (1306.8 gm) from the 10-15 centimeter size category, and a single (2480.5 gm) 15-20 centimeter sized fragment. Hard cobble / quartzite firebroken rock fragments include 13 fragments (79.0 gm) from the 0-5 centimeter size category and two fragments (133.0 gm) from the 5-10 centimeter size category.

Cultural level 4 at the Main Block of site EgNo 23 also contained a lithic assemblage comprised of 19 finished tools, 15 expediency tools, 10 cores, and 263 pieces of debitage. The finished lithic tools include a projectile point base fragment (Cat.No. 5064) manufactured of Swan River chert and a projectile point tip fragment (Cat.No. 5073) of brown chalcedony. Unfortunately neither tool can be assigned to a specific archaeological time period and, therefore, cultural level 4 can not be assigned a relative date other than predating the McKean Series of occupations. Cultural level 4 also produced four biface fragments, a failed preform, a preform fragment, a drill fragment, and a wedge. The unifacially finished lithic tool assemblage includes an end-and-side scraper, three endscrapers, a large scraping tool, two scraper fragments, a spokeshave, and a uniface. The expediency tools recovered from cultural level 4 include four retouched flakes, seven retouched flake fragments, a single retouched cobble spall, a retouched core fragment, a utilized flake, and a utilized flake fragment. A detailed description of the lithic tools from cultural level 4 is included in Appendix B. Excavation of cultural level 4 also resulted in the recovery of 10 cores (Table 6.7). The debitage assemblage from cultural level 4 includes flakes from all stages of lithic reduction and consists of 39 early stage flakes (14.8%), 70 second stage flakes (26.6%), 79 final stage flakes (30.0%), and 75 flake fragments / shatter (28.5%). The debitage assemblage is dominated by locally available materials with feldspathic siltstone, Cathead chert, Knife River flint, and Montana chert representing possible trade materials (Table 6.8).

Archaeological investigation of site EgNo 23 has concluded that multiple periods of site utilization exist across the entire site area, on both sides of the pipeline corridors which bisect the site. Precontact utilization of the sandhills for typical campsite activities such as the processing of game resources and the manufacture and repair of lithic tools, and the use of the sandhills topography for the hunting of bison is evident at site EgNo 23. Based on the recovery of time diagnostic artifacts

from surface collection, testing, and controlled excavation, precontact utilization of site EgNo 23 can be dated to the Late Plains, Avonlea, Besant, Pelican Lake, Duncan, Hanna, and McKean phases. Archaeological site EgNo 23 provides a picture of the repeated use of the Douglas Park sandhills throughout the last 5000 years.

Table 6.7 : Cores recovered from cultural level 4; Main Block, site EgNo 23, Permit 01- 45.

CORE TYPE	MATERIAL TYPE	CAT.NO.
exhausted bipolar	Swan River chert	5035
exhausted bipolar	Swan River chert	5036
flake core	brown quartzite	5034
multidirectional core	Swan River chert	5037
multidirectional core	Swan River chert	5040
multidirectional core	white quartz	5050
core fragment	silicified wood	5038
core fragment	pink quartzite	5039
core fragment	grey quartzite	5049
core fragment	Swan River chert	5058

Table 6.8 : Lithic material types represented by debitage recovered from cultural level 4; Main Block, site EgNo 23, Permit 01- 45.

MATERIAL TYPE	count	%
argillite	3	1.1
basalt	5	1.9
chalcedony	8	3.0
chert	21	8.0
feldspathic siltstone	1	0.4
miscellaneous coarse	15	5.7
porcellanite	3	1.1
quartz	19	7.2
quartzite	97	36.9
quartzose	9	3.4
silicified peat	9	3.4
silicified siltstone	3	1.1
silicified wood	27	10.3
Cathead chert	2	0.8
Knife River flint	2	0.8
Montana chert	1	0.4
Swan River chert	38	14.5
total	263	100

CHAPTER 7

PRECONTACT UTILIZATION OF SANDHILL ENVIRONMENTS OF THE GREAT PLAINS

Archaeological sites EgNn 9 and EgNo 23 are located within the Douglas Park Sandhills, an area of stabilized sand dunes within the Moist Mixed Grassland Ecoregion of the Prairie Ecozone (Acton et al 1998). A detailed description of the physiography, climate, hydrology, vegetation, and wildlife of the Moist Mixed Grassland Ecoregion and the sandhills is included in chapter 2. The Moist Mixed Grassland Ecoregion represents the northern-most extension of the open grasslands environment which extend from the high plains of Texas into southern Manitoba, Saskatchewan, and Alberta (Figure 7.1). The open grasslands environment or ecosystem is associated with the Great Plains archaeological culture area, and sites EgNn 9 and EgNo 23 are located within the Northern Plains subdivision (Kay 1998). The Great Plains were dominated by grasslands and bison, and precontact populations developed a highly successful nomadic lifeway based on a seasonal round following resource availability. Within the grasslands ecosystem regional variants are and were present, including such subsystems as the foothills of Alberta and Wyoming, and sandhill systems including the Douglas Park Sandhills in which sites EgNn 9 and EgNo 23 are located. Sandhills provided relatively stable 'islands' of dependable and varied resources which supplemented the resources available within the greater grasslands ecosystem. Investigation has revealed that precontact utilization of sandhill systems began following glacial retreat and continued throughout the archaeological record. The following chapter deals with subsistence and settlement patterns seen within the greater grasslands ecosystem, and more specifically, within sandhill systems across the Great Plains.

7.1 Variation Within Grassland and Sandhill Environments

The grasslands environment or ecosystem of the Great Plains of North America has been described as a uniform sea of grass, however, closer examination

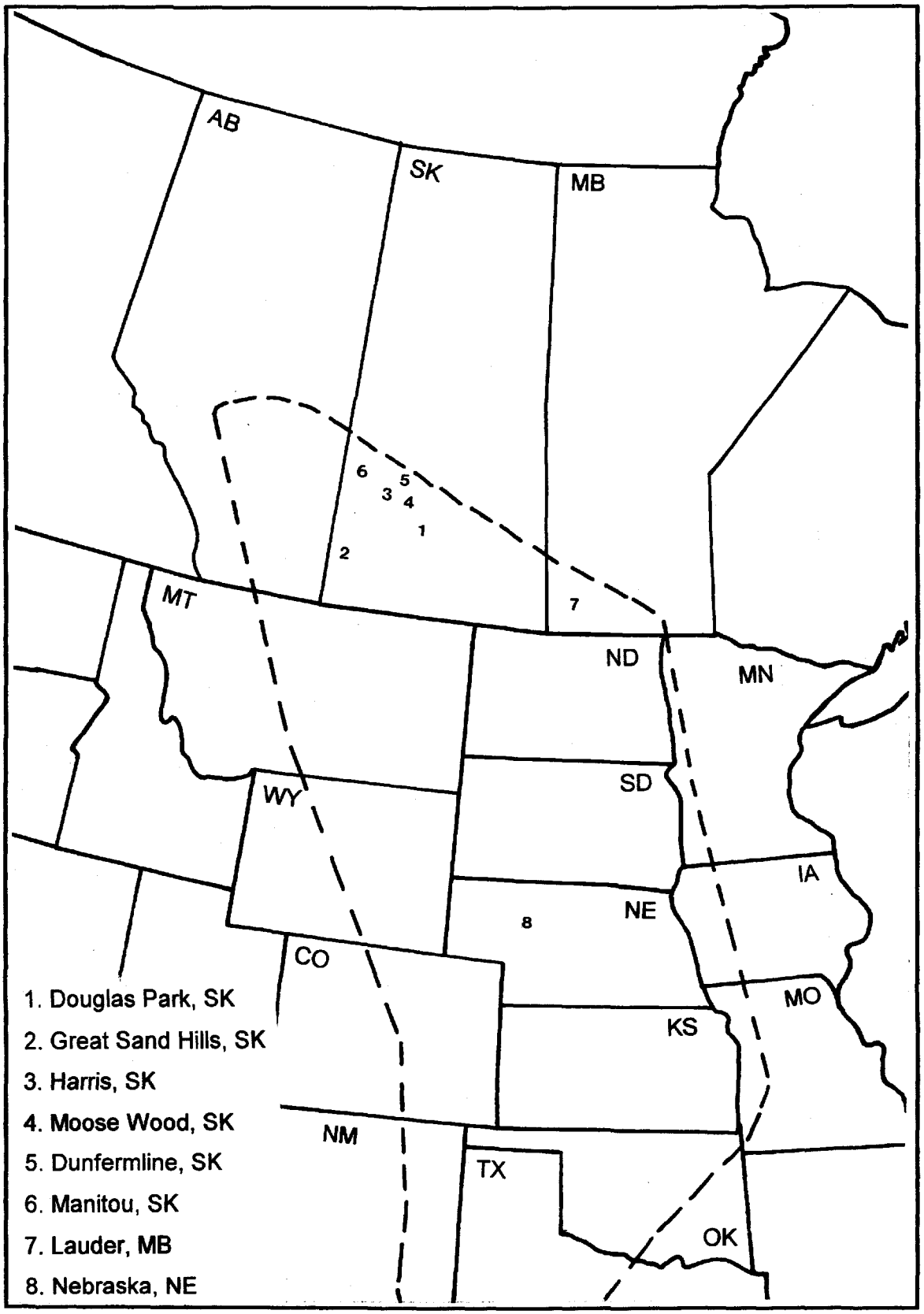


Figure 7.1 The Great Plains cultural area and related sandhills systems.

reveals that the area "is one of significant diversity and contrast in landforms, vegetation, wildlife, and people" (Kay 1998:18). The term ecosystem refers to the interaction between the organic and inorganic components of the biosphere. The energy flow and biological cycling allow organisms within the ecosystem to perpetuate themselves and classification is frequently based on the dominant vegetation "as plants dominate the biomass of terrestrial ecosystems" (Tivy 1993:21). Plants form the most visible component of an ecosystem, as well as being the primary source of food energy for all other living organisms.

The grasslands of North America appeared to many observers to be an uninterrupted, monotonous sea of grass. Early explorers marveled at the diversity and abundance of species but were not "impressed with the land's potential for settlement" (Licht 1997:10,11). Likewise, early surveyors sent into the region in advance of European colonists declared the region a desert unfit for agriculture. Yet the grasslands are a diverse landscape consisting of a series of intricate relationships (Potyondi 1995). The grasslands appear uniform and monotonous primarily due to the lack of trees and vegetational levels. The grasses and sedges which dominate the grasslands represent a large number of genera and species with a wide range of habitats. Yet these grasses and sedges exhibit a "greater homogeneity of growth form than in any other family of flowering plants of comparable size" (Tivy 1993:212). The Great Plains of North America can be divided into three zones : the tallgrass prairie, the mixed grass prairie, and the shortgrass prairie (Licht 1997). As the titles imply, these zones are defined by the grass species which dominate the vegetation cover. No distinct boundaries delimit these zones, rather the prairies form a gradient in vegetation largely determined by rainfall.

In addition to the variation created by the number of plant genera and species within the grasslands, seasonal variation exists within each prairie zone. An equilibrium was generally achieved within the grassland ecosystem with different species reacting differently to levels of sunlight, soil moisture, soil nutrients, and when the species matured and seeded (Malin 1984). Levels of rainfall and snow melt affect the annual and seasonal availability of the vegetation as "the primary factor limiting productivity in most grasslands is water, not nutrients" (Redmann 1982:225). Changes in the level of precipitation resulted in changes in plant communities and

subsequently "animal and human carrying capacities also shifted in response to such changes" (Frison 1998:140).

The grasslands were subject to fires, severe winters and hot summers, periodic droughts, violent wind storms, and rivers which continually cut new courses, and as such the "vast grasslands appeared never changing but were in reality always changing" (Licht 1997:10). The plant species within the grasslands are well adapted to the extremes and changes in habitat. Grass seeds are easily dispersed and can remain dormant for several years before germination (Tivy 1993). The root levels of the grasses, forbs, and woody plants which make up the grasslands vary as much as the above ground aspect of the plants. Different species send roots down to different depths and "one square yard of prairie soil may contain twenty linear miles of roots and root hairs" (Licht 1997:5). The underground parts of the plants; the rhizomes, corms, bulbs, and tubers are "particularly important as defenses against the temperature extremes of heat and cold" (Malin 1984:35). The meristematic portions, or growth tissues, of grasses are located at the base of the plant which makes grasses highly tolerant to defoliation. Grass growth can in fact be stimulated by cutting, burning, and grazing (Tivy 1993). The Great Plains are also noted for the almost constant presence of the wind. While winds could prove damaging and cause discomfort, the wind served as "an important factor in the winter survival of large ungulates, bison and pronghorn, by clearing areas of snow and exposing grasses for forage" (Frison 1998:141).

The grasslands support an abundance of mammals, many of which are large species that "tended to be more gregarious and visible than the reclusive animals of the forest: hence their numbers were often viewed by the first explorers with incredulity and awe" (Licht 1997:5). Of the large game species, bison have become synonymous with the image of the Great Plains, and the interaction between the bison and the grasses of the Plains suggests a biological basis for this image. Early explorers referred to the bison herds as swarms of locusts, leaving in their wake what was viewed as a trail of destruction. The herds grazed the grasses down to the ground, they left treed stands as collections of splintered and uprooted trees after rubbing on the trees and crowding into groves to find shade, and they left water sources churned up and fouled with urine and dung (Potyondi 1995). The huge herds

trampled vegetation and left deeply rutted trails which, in addition to their wet and dry wallows, accelerated soil erosion. They also left a cover of dried dung 'chips' across the grasslands and "their ubiquity contributed significantly to the devastation of nineteenth-century prairie fires" (Potyondi 1995:14).

Yet this heavy impact on the environment gave rise to many positive effects. The heavy grazing of the grasses fostered the growth of shrubs and forbs which were the favoured food of such species as antelope and deer. Heavy grazing also slowed the growth of grasses allowing for the growth of willows and aspens which attracted deer and elk. The antelope, deer, and elk in turn would reduce the shrub and tree communities promoting the return of grasses which attracted the bison herds and began the cycle again. If left too long a grassland becomes stagnant with dead material and snow mould, and as a result there is no new growth. The bison herds came into an area and grazed "aggressively, indiscriminately, briefly, and rarely" (Gayton 1990:106). The herds churned up the soil and mixed in seeds, litter, urine and dung which promoted grass regeneration. The wallows and deeply rutted trails left by the huge bison herds promoted the creation of colonies of burrowing animals. Disturbances in the thick and dense root mat of the grasslands enabled the establishment of communities of species such as ground squirrels, foxes, and burrowing owls. These burrowing communities mixed soils and incorporated vegetation into the soil. The burrows also served as traps for rainfall and, in conjunction with the soil mixing, increased soil fertility. The burrows and tunnels also counteracted the trampling and packing of the soil by the large hoofed herds (Malin 1984). The burrowing species aided soil development through the redistribution of soil while the compaction of the soil by the large hoofed species "reduced water losses through transpiration and evaporation during dry periods" (Malin 1984:36). These burrowing communities also added to the biological diversity of the grasslands and, with the larger mammal species, provided a huge stable resource base for human populations and animal predators such as wolves, coyotes and bears (Potyondi 1995).

Variation within the Great Plains grasslands is also created by the landforms within the ecosystem. The grasslands of the Northern Plains have been shaped by glacial action. The bedrock across most of the region is overlain by glacial till which

exhibits sediments ranging in size from silts to cobble-sized rocks (Storer 1989). Glacial till was deposited across the region through the advances and retreats of the glaciers, and by sheets of meltwater from the retreating glaciers (Storer 1989). Glacial till deposits created diversity within the landscape of the grasslands but also provided lithic resources for precontact inhabitants of the region. Hind (1971[1860]) recorded that the entire region through which he traveled was blanketed with glacial deposits including boulders, erratics, and gravels with very few bedrock outcroppings. Quaternary period glacial deposits across the southern portion of the province are relatively uniform with approximately 35% of the sediment load comprised of highly resistant Precambrian rock from the exposed bedrock of the Canadian Shield. The remainder of the sediment load consists of softer Cretaceous rock added to the ice mass as the Laurentide ice sheet advanced across the softer bedrock layers of the southern portion of the province (Simpson 1999). The Quaternary glacial deposits provided the majority of the lithic raw materials utilized by precontact populations including the granites, gneisses, quartzites, slates, cherts and sandstones which comprise the 'Shield' rocks within the gravels. An additional source of high quality lithic materials are the Tertiary gravels which underlie the Quaternary deposits across the southern portion of the province. The Tertiary deposits consist of the metaquartzites, orthoquartzites, and western carbonates (argillites and black cherts) which originated in the Cordilleran range to the west (Shetsen 1984).

The volumes of meltwater flowing from the retreating ice sheets carved deep channels in the till and bedrock, and now form such river valleys as the South Saskatchewan and Qu'Appelle valleys (Storer 1989). These rivers and their valleys represent areas of major local relief, provide dependable sources of water, and support an array of botanical, mammalian, and avian resources not seen within the greater grasslands ecosystem. Glaciation also created a series of wetlands scattered across the Great Plains. As the glaciers retreated, blocks of ice calved off and were buried in the moraine. As the ice melted, overlying deposits of moraine till collapsed inward leaving depressions surrounded by low hills (Storer 1989). This knob-and-kettle topography created the "tens of millions of shallow wetlands dotting the landscape, especially in the region that would become the Dakotas, Minnesota, Alberta, and Saskatchewan" (Licht 1997:9). These depressions trap rainfall and snowmelt, and become "breeding factories for countless waterfowl and other wetland-

dependent species." (Licht 1997:9). These wetlands frequently support aspen groves which exhibit habitats similar to those seen within river valleys. Even the saline lakes and ponds created where seepage of ground water occurs in undrained depressions support a variety of species.

The final glacial landform represented on the Great Plains consists of sandhills, the distinctive landform which is a major focus of this thesis and forms the environmental setting of sites EgNn 9 and EgNo 23. Sandhills are characterized by sandy sediments, rather than the glacial till which blankets most of the Northern Plains. Sandhills were created through post-glacial wind redistribution of the sands, silts, and clays deposited as deltas where meltwater channels entered glacial lakes (Acton et al 1998). Sandhills continue to be altered principally by wind action as "precipitation percolates through the sand to the water table before it has a chance to accumulate on the surface; therefore, there is very little surface runoff, and the landform generally is not shaped or affected by streams" (Epp and Towney-Smith 1980:5). Sandhill areas consist of a variety of landform types with varying associated vegetation cover. The landforms range from low stable dunes which support typical grassland and open shrubland vegetation to high stabilized dunes. The vegetation on the high dunes is determined by aspect and moisture, with south or southwest facing slopes supporting grassland or open shrubland vegetation and north facing slopes harbouring closed shrubland cover. Low areas between the dunes support grasslands, saline grasslands, shrublands or trees depending upon the level of moisture and soil development (Towney-Smith 1980a). Areas of active sand movement are largely devoid of vegetation (Towney-Smith 1980a). Sandhills are an active landform as stability is determined by levels of moisture. Dry conditions can deplete vegetation cover allowing for the displacement of once-anchored sand deposits. Studies of sections of the Great Sand Hills northwest of Swift Current determined that dune movement during the late 1950's to the early 1960's ranged from 0.68 to 6.47 meters per year (Towney-Smith 1980b).

Sandhills support botanical, mammalian, and avian species seen within the greater grasslands ecosystem but also support species seen in more specialized environments. The varied environmental settings within sandhill systems support species seen in arid sandy regions, those seen in moister wetland and parkland

regions, as well as species which are unique to sandhills (Towney-Smith 1980a). In addition to the variety of resources provided by sandhills, a key component of the sandhills of the Great Plains are the wetlands found within the hills. Wetlands are created by stable underground aquifers, with the pothole lake or slough encompassed by "concentric rings of aquatic and arboreal vegetation surrounded by mixed grass prairie" (Hamilton and Nicholson 1999:9). The presence of wetlands within sandhill environments also reduced the frequency and severity of the wildfires since the standing water protected the surrounding woody vegetation. The woody vegetation, in turn, created windbreaks which fostered the formation of linear sand dunes resulting in the dunes and woody vegetation both protecting the wetland at their core. Hamilton and Nicholson (1999) classify the sandhills and associated wetlands of the Plains as 'ecological islands'. These 'islands' provided a stable and diverse resource base which added to the richness of the greater grasslands environment.

7.2 Subsistence and Settlement Strategies Exhibited Within Grassland and Sandhill Environments

Human adaptation to the Great Plains of North America began following glacial retreat and the opening of the vast grasslands. Subsistence focused on big game hunting, however, as ecosystems stabilized and the megafauna species on which early human populations depended became extinct or became significantly reduced in size, subsistence patterns shifted. Beginning approximately 8000 years ago human populations began to adopt a broad spectrum hunter-gatherer adaptation type (Frison et al 1996). While communal bison hunting continued to form a major component of adaptation, human populations across the Great Plains began to utilize multiple resources available within the grasslands and the diverse (and sometimes unique) species present within the associated sandhill environments.

However, as Butzer (1985) notes decisions regarding human subsistence and settlement strategies are based on more than just resource availability. Winterhalder states that "(a)ll environments contain more species that are edible to humans than can be effectively harvested by them" (Winterhalder 2001:14). Likewise, multiple resources are available at the same time and, therefore, decisions regarding which resources are to be targeted by a human population are made based on "resource aggregation, productivity and predictability, the available technological and social

organization, and a host of culture-specific attitudes and perceptions" (Butzer 1985:266). Butzer (1985) suggests that factors including dietary preference, the prestige function of a given resource, and demographic aggregation to successfully harvest the resource and to maintain cooperative social ties and reproductive viability have played a part in the choices made by human populations throughout time.

7.2.1 Dietary Choices

The Great Plains cultural area is frequently regarded as being synonymous with the massive bison herds which graced the Plains prior to settlement. Edwin Thompson Denig, assigned in 1837 to the American Fur Company post at Fort Union in present-day North Dakota, noted that

> The most numerous and useful animal in this country is unquestionably the buffalo, both as regards the sustenance of all the Indians and gain of the traders (Denig 2000[1930]:16)

Likewise, Henry Youle Hind during his 1858 expedition to the region associated with the Assiniboine and Saskatchewan rivers of present-day Saskatchewan noted the importance of the bison to Plains First Nations who

> ...not only subsist upon its flesh, but from its skin and sinews they make their tents, clothing, saddles, bow-strings and dog harness. The hide cut into strips serves them for cordage, the sinews split into threads for twine. The dried dung is often their only fuel for weeks together on the treeless plains (Hind 1971[1860] Vol.1:104)

Bison produced the most weight and calories of fresh and dried meat per animal due to the large size of each individual animal. Information compiled by Youell (2005) determined the efficiency indices of large ungulates hunted by precontact populations across the Plains. Efficiency indices of 50.2 for bison, 16.1 for antelope, and 10.2 for mule deer were determined factoring in the population density of the ungulate species being hunted, success ratio of hunted species, minimum number of hunters needed for a successful hunt, calories expended per animal hunted, and total calories per animal hunted (Youell 2005). Bison produced a larger return for energy expended in hunting and processing the animals, therefore, when bison herd and human aggregation corresponded, communal bison hunting would have been a logical preference. Archaeological sites tend to be dominated by bison remains but this prevalence may reflect the differential preservation of dense bison bone, as much as

dietary preference. Smaller species were still valid choices depending upon hunting strategy employed, interception of species during human migration for other resources (the encounter-contingent model of resource selection [Winterhalder 2001]) or the desirability of the hide and/or other portion of the animal (not just meat) provided by the species.

Ethnographic information indicates that Plains populations utilized a great diversity of resources. Denig (2000[1930]) lists the plant and animal resources utilized by the Assiniboine which included 22 different roots and berries (including prairie turnips, currants, wild rhubarb, acorns), 29 species of mammals (such as bison, antelope, elk, deer, fox, porcupine, rabbit, ground squirrel, lynx, bear), and eight specific bird species plus "small bird of any sort" (Denig 2000[1930]:189). Mandelbaum (1996) records 26 species of mammals utilized by the Plains Cree including bison, moose, elk, deer and such small species as badger, coyote, lynx, marten and rabbit. The Plains Cree also hunted 31 different bird species including ducks, geese, prairie chicken, and sparrow hawk and gathered 22 species of vegetal foods such as 'Indian' turnip, wood carrot, saskatoon, chokecherry, wild raspberry, wild strawberry, and currants (Mandelbaum 1996). Roots and berries were consumed fresh and dried, and could also be pounded into a form of flour. Mandelbaum (1996) notes that the Plains Cree also used weirs to catch 13 species of fish from rivers within their territory during the spring.

While dietary preference, and prestige assigned to a specific food, may be hard to determine from an archaeological context (due to poor preservation), ethnographic sources provide some information regarding prestige foods amongst Plains populations. Among the Plains Cree "(t)he choice parts of a buffalo were the tongue, shoulder, fat from the teats, and heart" and pemmican was "highly relished" (Mandelbaum1996:58). Mandelbaum also notes that across the Great Plains "tongue is everywhere held to be the choice part of the buffalo and is often collected for ceremonial use" (Mandelbaum 1996:330) Amongst the Assiniboine, it was noted that

> At all times the different kinds of roots and berries are a great resource, are used in their principal feasts and medicine ceremonies, are of great assistance when game is not to be found, are easily packed, and contain considerable nourishment (Denig 2000[1930]:188).

Hind recorded the collection of saskatoon berries by Cree women near Buffalo Pound Lake during the summer of 1858 and that the women "had collected a great quantity of the mesaskatomina berry which they were drying ...which they prize so highly, and which forms an important part of their summer food" (Hind 1971[1860] Vol.1:339). Likewise, Mandelbaum records that for the Plains Cree "(b)erries were the proper ceremonial food" (Mandelbaum 1996:75). However, Denig suggests that for the Assiniboine it was the quantity of food (especially meat) that was important, namely in the form of feasting

> ...in times of plenty most of the men eat six, eight, ten, and as high as twenty times during a day and night. In times of comparative scarcity but two meals are had, morning and night. When meat is very nearly exhausted one meal must suffice, and for the rest the women and children are sent to dig roots or gather berries as the season and place afford (Denig 2000[1930]:115)

7.2.2 Prestige Items

Butzer (1985) suggests that subsistence and settlement choices made by precontact populations involved more that just dietary preferences and seasonal resource availability. Precontact populations also made decisions which allowed for the harvesting and collection of prestige items. Ethnographic references indicate that for contact-period Plains populations horses and guns rapidly became the most sought-after items for possession and exchange, replacing most of the prestige items favoured by precontact populations. Exotic items recovered from archaeological sites across the Great Plains are relatively rare, largely due to the fact that many items were manufactured of fragile and/or organic materials. Exotic materials recovered from campsites across the Great Plains consist largely of lithic materials traded from quarry sources beyond normal seasonal rounds. However, Frison (1998) suggests that little evidence of the long-distance movement of lithic materials exists following the Paleoindian Period.

Other exotic materials recovered from cave sites and burial sites on the Plains relate to decoration and ornamentation of individuals and their belongings. Ethnographic references indicate that ornamentation incorporated shell, teeth, bones, claws, hair, fur, feathers, quills, and pigments (Pritzker 2000). Marine shells from the Pacific coast and the Gulf of Mexico have been recovered from archaeological sites across the Great Plains, as have more durable materials including copper from the

western Great Lakes region of eastern Canada, carved items of catlinite from Minnesota, and *iniskim* (fossils with the natural appearance of a bison) from glacial gravels across the Plains (McMillan 1995). During the 1850's dentalium shells from the Pacific and Atlantic coasts were so highly valued by the Hidatsa and Gros Ventre of eastern Montana and northwestern Dakota that early white traders within the region obtained the shells for use in their own trade endeavours (Clark 1963). Exotic goods are frequently found as mortuary offerings, however, during the greater part of the Plains precontact record the practice of scaffold burial appears to have been the norm (Mandelbaum 1996) with the large burial mounds identified in the eastern Plains representing more recent influence from the Eastern Woodlands (McMillan 1995). A major precontact period burial site on the Northern Plains , the Gray site located northwest of Swift Current, contained the remains of 154 individuals interned with various burial goods (Millar et al 1972). Mortuary offerings recovered during excavation of the Gray site included lithic tools, as well as red ochre, worked bone, shell beads and gorgets, and fragments of copper (Millar et al 1972). Likewise, the Bracken Cairn burial site located in the southwest corner of Saskatchewan contained the remains of at least five individuals and a variety of mortuary offerings (Walker 1982). Excavation revealed the interment of lithic tools and numerous faunal elements from a variety of mammalian and avian species, including swift fox, kit fox, beaver, bear, antelope, and Canada goose. Some of the faunal elements had been worked to form bone tools, and cut and polished decorative objects. The Bracken Cairn burial contained red ochre and limonite pigments, bone pendants and beads, shell gorgets, and one rolled copper fragment (Walker 1982).

The nomadic lifestyle of the precontact Plains populations precluded the accumulation of large amounts of cultural materials including prestige items. The material culture of Great Plains precontact populations consists of easily maintained tools and "where possible hunter-gatherers optimise portability by adopting generalised tool-kits" (Torrence 2001:86). Among hunter-gatherers "material accumulation is unattractive to those who must move frequently and carry their property with them" (Winterhalder 2001:30). Intra- and inter-group exchange is also characteristic of hunter-gatherer societies and "transfer behaviors also can act to discourage excess production" (Winterhalder 2001:30). However, precontact populations selected seasonal rounds which incorporated locations where items of

prestige or exotic materials were collected and/or traded for, in addition to locations which provided more basic subsistence needs.

7.2.3 Demographic Aggregation

Demographic aggregation for the harvesting of resources, and for the maintenance of social ties and the conduct of ceremonial activities also factored into the subsistence and settlement choices of precontact populations (Butzer 1985). Precontact populations moved freely throughout the Great Plains region following resource availability. As Daniel W. Harmon, an employee of the North West Company stationed at fur trade posts across present-day Saskatchewan and Alberta, noted

> The Indians who reside in the large plains, make no subdivisions of their territory ; for the wealth of their country consists of buffaloes and wolves, which exist in plenty, everywhere among them (Harmon 1911:331)

Adaptation to the grasslands of the Great Plains "called for continual aggregation and fragmentation of the (human) groups" (Frison 1998:147). Human aggregation and cooperation was necessary for communal bison hunting, the harvesting of plant resources, and the quarrying of lithic materials. Cooperation was necessary to allow for the harvesting of the resource while a portion of the population attended to the day-to-day activities necessary for survival (Frison 1998). A large number of people would allow for the harvesting and processing of a greater volume of any given resource while, conversely, a greater concentration of resources would be need to support the population gathered for communal harvesting.

Demographic aggregation was also necessary to maintain social ties between seasonally-dispersed members of the same cultural group, and with members of neighbouring cultural groups. Aggregation also allowed for the conduct of social and spiritual ceremonies. Amongst the Pegogamaw Crees of north-central Saskatchewan ingathering centers formed an important part of the seasonal rounds of the people (Meyer and Russell 2004). During the spring and autumn ingathering centers became the central meeting ground for the dispersed regional bands as "through the remainder of the year smaller social groups moved through theirs lands, as necessitated by economic needs and spiritual 'pursuits'" (Meyer and Russell 2004:246). Mandelbaum (1996) notes that amongst the Plains Cree seasonal

gathering of dispersed human groups occurred during the summer and autumn when communal resource harvesting was combined with ceremonial activities. He records that

> ...the Plains Cree looked forward to the annual Sun dance encampment. Messengers bearing tobacco and invitations were sent out in the spring. Late in June or early in July the scattered sections of a band, or even several bands, converged to the preappointed places where ceremony was to be held. The great encampment might hold together for two weeks or even longer, if there were buffalo herds in the vicinity (Mandelbaum 1996:77)

Likewise,

> With the onset autumn, a few of the men separated from the larger group to hunt elk and deer. The Smoking Tipi ceremony was performed. As the weather turned cold, buffalo pounds were built and a successful pound was the nucleus for a large gathering of families (Mandelbaum 1996:77)

Amongst the Assiniboine, Denig noted that communal gathering for feasts allowed for the conduct of "(m)ost of their private business, bargains, settling disputes, hearing news, asking advice, required loans, and indeed all their transactions with individuals" (Denig 2000[1929]:120). Meyer and Russell suggest that for the Pegogamaw Crees ingathering centers "played an important role in the cultural landscape of these people - and were almost certainly spiritually charged" (Meyer and Russell 2004:246).

7.3 Precontact Utilization of Sandhill Environments of the Northern Plains

The grasslands ecosystem provided most of the resources need by the precontact populations of the Great Plains, however, part of the natural cycle of the grasslands are periods of drought. This resource instability appears to have been counterbalanced by precontact utilization of "relatively permanent anomalous environments, small ecosystems related to but not the same as the grassland biome" (Epp 1986:51) such as valleys, hills, heavily eroded areas, and sandhills. These small ecosystems supported resources that could be exploited upon the failure of the larger grasslands biome. Epp notes that "habitation sites within easy access of more than one ecosystem added to resource variety and, hence, stability the year round, a conclusion based on the now empirically verified ecological tenet that ecosystem variety and stability are related positively" (Epp 1986:61). The sandhill environments across the Northern Plains represent such 'anomalous' small ecosystems, or 'islands', which added to resource stability within the broader grasslands environment.

7.3.1 Resource Diversity Within Sandhills

The gently undulating topography of the sandhills and the pockets of woody vegetation associated with wetlands within the sandhills provided forage and shelter for animals, as well as food, shelter, and sources of firewood for human populations. These woody pockets within the sandhills also created ideal trap locations for hunting bison (Hamilton and Nicholson 1999). Verbicky-Todd (1984) has identified three major methods of precontact communal bison hunting based on a comprehensive review of ethnographic records from contact period Plains populations. Pre-horse bison hunting involved impounding, jumping, and surrounding and the topography of sandhills would have been suitable for all but bison jumping. Bison pounding involved construction of a corral on or at the base of a natural slope, beneath a precipice high enough to prevent bison from leaping out, or on level ground (Verbicky-Todd 1984). Ethnographic records indicate that pounds were used year-round though more commonly utilized during the fall and winter seasons. Communal hunting using the surround method involved the highly structured and coordinated effort of hundreds of individuals to stealthily encircle a bison herd. The human circle would gradually close in on the herd until the animals were within range. Hunting was facilitated by the confusion created when the herd was in close proximity to each other and when animals began to fall to human weapons. Ethnographic records indicate that 80 to 100 individuals could kill 100 to 500 bison using the surround technique and that "hunters took advantage of the natural terrain to conceal themselves while attempting to surround a herd" (Verbicky-Todd 1984:137). Sandhill terrain would also have been suitable for individual and small-scale hunting strategies including the use of natural traps (snow, fire, ice) and stalking, with or without the use of disguises or decoys.

Henry Youle Hind (1971[1860]) documented use of the Douglas Park Sandhills (Figure 7.1) for the pounding of bison during the summer of 1858. On July 29, 1858 Hind and his party encountered a group of Cree camped in the sandhills and were invited to view their recent bison pound. He writes

> I accompanied the guide to a little valley between sand hills, through a lane of branches of trees, which are called 'dead men' to the gate or trap of the pound...we ascended a sand dune overhanging the little dell in which the pound was built. Within a circular fence 120 feet broad, constructed of the trunks of trees, laced with withes together, and braced by outside supports, lay tossed in every conceivable position over two hundred dead buffalo (Hind 1971[1860] Vol.1:356)

Archaeological evidence of precontact construction of bison pounds within sandhill environments of southern Saskatchewan has been identified during excavation of the Melhagen site, also located in the Douglas Park Sandhills or Aiktow Sandhills (Figure 7.1), at the Fitzgerald site within the Moose Wood / Dundurn Sandhills (Figure 7.1), and the Tschetter site within the Dunfermline Sandhills (Figure 7.1). The Melhagen site is located approximately 3.5 kilometers south of site EgNo 23 and dates to the Besant phase of Plains prehistory. Excavation revealed five bone beds containing the remains of over 170 bison with pound construction incorporating the natural terrain indicated by the identification of a single post hole (Ramsay 1991). The Fitzgerald site is located approximately 100 kilometers north of sites EgNn 9 and EgNo 23 and also represents a Besant phase bison pound. Excavation revealed a series of post holes indicating the construction of a corral structure used to trap an extrapolated estimate of 800 bison (Hjermstad 1996). The Tschetter site is located approximately 150 kilometers northwest of sites EgNn 9 and EgNo 23 and dates to the Late Precontact Period of Plains prehistory. The construction of a corral structure is suggested by the identification of eight post holes in association with a bone bed containing the remains of approximately 100 bison (Prentice 1983). The kill deposits identified at site EgNo 23 do not provide evidence of the exact method of communal hunting utilized by the precontact inhabitants of the Douglas Park Sandhills (Figure 7.1). The McKean Series kill deposits identified during monitoring in 1999 were too disturbed to reveal evidence of pound construction while excavation of the Pelican Lake phase kill during 2001 did not extend to the periphery of the bone bed where post holes associated with pound construction would be located. Precontact hunting using sandhill terrain for the surrounding of bison herds would leave no physical evidence as no structures were necessary. Likewise small-scale hunting and stalking of bison would leave no evidence of hunting strategy employed, only evidence of the processing and associated campsite activities of the precontact hunters.

Archaeological investigations within sandhill environments across the Northern Plains have provided evidence of the wide array of resources harvested within the sandhills and the use of the 'islands' during periods of environmental stress. The Harder site is located in the Dunfermline Sandhills (Figure 7.1), approximately 150 kilometers northwest of sites EgNn 9 and EgNo 23, and dates to the Oxbow time period. Excavation at the campsite revealed that the precontact inhabitants of the

sandhills hunted moose, wolf, coyote, swift fox, hare and marten, in addition to bison (Dyck 1977). The Gowen sites (Walker 1992) are located within Saskatoon city limits and are situated on a terrace of the South Saskatchewan River at the northern edge of the Moose Wood Sandhills (Figure 7.1). Excavation revealed a faunal assemblage dominated by bison, but also including eight taxa representing such varied resources as antelope, canid, and muskrat. The Gowen sites date to the Middle Precontact period and the Altithermal, a time frame which has been classified as one of climatic extremes and environmental stress (Walker 1992). The Hartley site (Clarke 1995) is also located along the northern edge of the Moose Wood Sandhills (Figure 7.1), within Saskatoon city limits. The Hartley site dates to the Avonlea and Old Women's phases and, while the faunal assemblage is dominated by bison, excavation revealed the remains of 22 species of vertebrates (Clarke 1995). The varied resources recovered at the Hartley site include canid, fox, badger, hare/rabbit, beaver, squirrel, vole, owl, grouse, teal, and raven (Clarke 1995). Excavation also recovered fish remains, and while most of the specimens could not be identified as to family or species, the assemblage included elements identified as northern pike (Clarke 1995). The Jackson site located within the Lauder Sandhills of southwestern Manitoba (Figure 7.1) dates to the Late Precontact period. Excavation revealed a faunal assemblage dominated by bison, but also included 12 other taxa such as hare/rabbit, deer, beaver, aves, and canid (Playford 2001). The McIntosh site located near Enders Lake within the Nebraska Sandhills of eastern Nebraska (Figure 7.1) also dates to the Late Precontact period. Excavation revealed a faunal assemblage dominated by bison and fish, but also included 48 taxa representing such varied resources as geese, ducks, grouse, deer, antelope, jack rabbit, canid, muskrat, swift fox, and squirrel. Repeated use of the McIntosh site throughout the Late Precontact period accessed year-round resources suggesting the site served to "buffer the effects of Pacific episode droughts" (Koch 1995:56).

As Butzer (1985) notes, subsistence and setllement choices made by precontact populations were based on more than the availability of the resources necessary for basic survival. The sandhills of the Northern Plains would have provided precontact populations with some of the decorative and prestige goods which factored into their seasonal rounds. Mammalian and avian species harvested for decorative elements such as feathers, quills, fur, teeth, and claws would have

been available within sandhill environments. The presence of rare and unique species within the distinctive sandhills environment may have been an additional draw to the regions, however, given the fragility of most decorative and prestige goods such information is rarely found within archaeological contexts. The glacial tills associated with the grasslands surrounding the sandhills of the Northern Plains would have contained the *iniskims*, ochre, and lithic materials suitable for flintknapping which would have been of value to precontact populations.

The Douglas Park Sandhills (Figure 7.1) were also associated with spiritually significant landmarks for precontact populations utilizing the region. Mistusinne, a sacred glacial erratic which was destroyed during construction of the Gardiner Dam, may have provided precontact populations with an additional reason to travel to the Douglas Park Sandhills. Hind provides a detailed description of Mistusinne :

> About fourteen miles from the South Branch (South Saskatchewan River) there is a gigantic erratic of unfossiliferous rock on the south side of the valley. It is seventy-nine feet in horizontal circumference, three feet from the ground ; and a tape stretched across the exposed portion, from side to side over the highest point, measured forty-six feet. The Indians place on it offerings to Manitou, and at the time of our visit it contained beads, bits of tobacco, fragments of cloth, and other trifles (Hind 1971[1860]:364).

The Earl of Southesk, who traveled through the area associated with the elbow of the Saskatchewan River and the Aiktow valley, recorded of the Douglas Park Sandhills (Figure 7.1) :

> we came to the Sandy Hills ...(they) are entirely composed of sand as fine as that of the sea-shores (where the) Crees fancy that the souls of good men enter into a paradise concealed amidst these arid ranges (The Earl of Southesk 1875:71)

The Blackfoot placed similar spiritual significance to the Great Sand Hills of southwestern Saskatchewan (Figure 7.1), and as Ewers notes

> Blackfoot Indians believed that after death the soul traveled to the Sand Hills, a desolate country south of the Saskatchewan River. There the deceased entered upon a new life similar to the one he or she lived on earth (Ewers 1958:184)

Of particular note is the fact that at the time of Earl of Southesk's visit to a camp of Assiniboines within the Aiktow valley "very little game was left in those parts, the four years' peace between the tribes having enabled them to hunt on that generally

debateable ground" (Earl of Southesk 1875:43). Settlement decisions appear to have been made by the Assiniboine group based on cultural or spiritual needs, rather than resource availability.

7.3.2 Seasonality of Sandhills Use

In addition to the variety of resources available, sandhills also provided precontact inhabitants with "seasonally balanced opportunities for warm season foraging and cold season bison hunting" (Hamilton and Nicholson 1999:23). Favourable conditions for the wintering of large ungulate herds, and subsequently winter hunting by human populations, have been recorded within sandhills across the Plains. In regards to the Nebraska Sandhills in particular, Myers (1995) notes

> To the surprise of early ranchers, the Sand Hills provided refuge for cattle that broke through fences and wandered into the region ahead of blizzards. The broken landscape scattered the winds, leaving deep patches of snow alternating with bare grass. Bison must have been similarly favored by the dune morphology (Myers 1995:61).

Debate regarding the winter abandonment of the Plains by bison herds and the human populations which subsided on them has figured into recent archaeological research on the Great Plains. Morgan (1980) compiled modern bison studies and historic reports of bison behavior to argue for a regular seasonal migration pattern for precontact bison herds across the Northern Plains. Bison herd movement from summer ranges on the xeric mixed prairie to wintering grounds within the mesic mixed grass prairie, aspen grove region / parklands, and major rivers valleys was proposed, with historic records and excavation of the Garrett site used to support the theory. Morgan (1980) suggests that historic accounts of bison herds crossing the South Saskatchewan and Qu'Appelle rivers in late June and July is evidence of herds wintering in more northernly areas arriving late in the summer range due to the greater distance being traveled. The Garrett site dates to the Late Middle Precontact and Late Precontact periods and represents a winter campsite in the Moose Jaw Creek valley of southwestern Saskatchewan. Morgan (1980) identifies the valley as being located within the southern-most extension of the winter range of precontact bison herds. Moodie and Ray (1976) also argue for 'zonal regularity' to precontact bison movements across the Plains. They suggest that the regular migration patterns were interrupted throughout history and prehistory when mild winters allowed for wintering

on the Plains or heavy snow fall altered migration patterns. Human-made disturbances such as fires deliberately set to alter bison movements and hunting by horseback may also have interrupted regular zonal movements of the massive bison herds (Moodie and Ray 1976). A variation on these theories has been proposed which identifies dual dispersion in which "some herds migrated annually and others remained sedentary in suitable woodlands" (Epp 1988:317). The ecological islands created by the sandhills of the Plains would provide such 'suitable woodlands'. Malainey and Sherriff (1996) argue against the idea that bison herds left the Northern Plains during the winter as "inconsistent with historic accounts which clearly describe vast, stable herds of bison wintering on the Northern Plains" (Malainey and Sherriff 1996:333). Combining information gathered from historic records and archaeological investigations of winter campsites across the Plains they reject the idea that the region was uninhabitable for precontact human populations due to severe weather, a shortage of wood for fire and shelter, and the abandonment of the area by bison herds. While their research has expanded the extent of bison wintering grounds across the Plains, even Malainey and Sherriff (1996:347) show an absence of winter sites within the 'heart' of Palliser's Triangle. The region which appears to lack archaeological evidence of wintering on the Plains roughly corresponds with the DN Borden block and Grasslands National Park in southwestern Saskatchewan. Archaeological survey of Grasslands National Park has identified numerous sites within the region, however, no subsurface testing was conducted (Friesen 1998). Cultural materials associated with stone circle sites indicate habitation sites, firebroken rock clusters suggest processing activity areas, and bison drive lanes indicate communal bison hunting within the park. However, faunal materials associated with bison kill deposits would not survive generations of exposure on the ground surface of the region. As such, information regarding seasonality of use within Grasslands National Park could not be obtained from archaeological materials. Friesen (1998) indicates that the topography and resources available within Grasslands National Park, especially that of the Frenchman River valley, would have allowed for successful year-round use of the region by precontact populations.

A study conducted on 21 samples of bison bone collagen recovered from archaeological sites in British Columbia, Alberta, Saskatchewan, Manitoba and Montana attempted to answer the question of bison migration (Chisholm et al 1986).

Stable-carbon isotopic analysis identifies the presence of the stable-carbon isotope C_3 found in the grasses and shrubs common to the parklands and C_4 which identifies the short grasses of the xeric prairies. The study concluded that some bison herds did move between the parklands and the shortgrass prairies while other herds remained sedentary. The authors raise the possibility that herds located within the shortgrass prairie may have moved seasonally into local environments which provided the necessary winter resources, rather than migrating over long distances. This scenario is suggested by the remains of bison from archaeological sites near Medicine Hat, in the shortgrass prairie of southeast Alberta. The bison remains displayed high amounts of the C_3 isotope which suggest the bison migrated to the parkland or may have "wintered in sheltered locations, such as river valleys or the Cypress Hills forests" (Chisholm et al 1986:202), with this latter pattern supported by ethnographic accounts. Recent analysis of stable isotopes from bison bone recovered from archaeological sites across southern Saskatchewan also suggests that precontact bison herds utilized multiple adaptive strategies (Leyden 2004). Ratios of stable carbon, nitrogen, and hydrogen isotopes were analyzed to determine the diet of precontact bison herds thereby providing information regarding the climate and vegetation of the region. Analysis indicates that the bison herd represented at the Fitzgerald site responded to climatic change by remaining sedentary, adopting selective foraging of C_4 plants and a "more efficient use of local vegetation" (Leyden 2004:130). The Norby site, located within Saskatoon city limits, dates to the Mummy Cave phase and yet the area exhibited the same environmental conditions revealed at the Fitzgerald site. However, analysis of the bison remains recovered during excavation of the Norby site suggests that the bison herd relied on a C_3 diet and, therefore, migrated to meet dietary requirements (Leyden 2004). Leyden (2004) concludes that bison behavior is not predictable through time as regional vegetation patterns, local climatic conditions, and differing adaptive biology of bison herds determined the dietary response to changing environmental conditions adopted by the bison herds represented at the tested archaeological sites. Stable isotope analysis indicates that some precontact bison herds remained within sandhill and grassland environments year-round and during periods of environmental stress, and therefore were available for exploitation by human populations throughout the archaeological record.

Archaeological investigation has confirmed that sandhills within the Northern Plains were utilized for the communal hunting of bison during the winter. Analysis of the faunal remains recovered from the Melhagen site confirm that bison pounding within the Douglas Park Sandhills (Figure 7.1) began in the fall and extended into the spring (Ramsay 1991). Faunal analysis confirms that the Tschetter site, within the Dunfermline Sandhills (Figure 7.1), also represents a series of winter kills (Prentice 1983). Investigations within the Lauder Sandhills of Manitoba (Figure 7.1) have also identified a winter bison kill at the Jackson site which represents communal entrapment of bison, probably using snowdrift traps (Hamilton and Nicholson 1999). The recovery of fetal and immature bison remains indicate that the site was used repeatedly beginning in the fall and extending into the spring (Playford 2001). Winter utilization of the Lauder Sandhills (Figure 7.1) is confirmed by the identification of a winter campsite, the Twin Fawns site (Playford 2001).

Year-round utilization of sandhills, and use during periods of environmental stress, have also been confirmed by archaeological investigation. The Hartley site (Clarke 1995) represents utilization of the Moose Wood Sandhills (Figure 7.1) during the spring. The recovery of the remains of migratory waterfowl and fish, in addition to fetal bison elements, points to spring occupation of the region (Clarke 1995). The McKean kill event at site EgNo 23 (Webster 2004) represents summer hunting of bison within the Douglas Park Sandhills (Figure 7.1), similar to the seasonality of the bison pound recorded by Hind during the summer of 1858 (1971[1860]). Likewise, archaeological investigation within the Lauder Sandhills of southwestern Manitoba (Figure 7.1) has identified summer utilization of the region at the Bradshaw site (Playford 2001). The Gowen sites represent summer utilization of the Moose Wood Sandhills (Walker 1992) while the Fitzgerald site (Hjermstad 1996) represents a fall kill event within the Moose Wood Sandhills (Figure 7.1). The Melhagen site provides evidence of the repeated use of the Douglas Park Sandhills (Figure 7.1) beginning in the fall and extending into the spring (Ramsay 1991). As discussed above, the Tschetter site (Prentice 1983), and the Jackson and Twin Fawn sites (Playford 2001) represent winter utilization of sandhill environments. Utilization of the 'anomalous' environments provided by sandhills within the Great Plains during periods of environmental stress has been confirmed during archaeological excavation. The McIntosh site, located in the Nebraska Sandhills (Figure 7.1), represents utilization of

sandhill environments during a period of environmental stress in the Late Precontact period (Koch 1995). The Gowen sites represent use of the Moose Wood Sandhills (Figure 7.1) during a period of environmental stress associated with the Middle Precontact period (Walker 1992).

7.3.3 Temporal Range Of Sandhills Use

The resources available within sandhill environments provided a valuable addition to the subsistence strategies of human populations based within the larger grasslands ecosystem. A survey of Paleoindian sites across the eastern region of the Nebraska Sandhills (Figure 7.1) indicates that the inclusion of resources from sandhill environments as part of the regular seasonal rounds of Plains grasslands inhabitants began immediately following glacial retreat. The lithic tools recovered from the Paleoindian sites within the sandhills were manufactured of materials mined from quarries to the northwest, west, and southwest of the sandhills (all located within a grasslands ecoregion). Lithic quarries are also located to the north and east of the sandhills which, during the Paleoindian Period, was an area of boreal forest vegetation. The quarries within the boreal forest were not utilized indicating that the Paleoindian populations utilizing the sandhills were based within the grasslands to the west (Myers 1995).

Research has confirmed that sandhill environments across the Northern Plains have been utilized throughout the archaeological record. Numerous single component and multicomponent sites were identified during major studies of the Harris Sandhills and the Great Sand Hills of Saskatchewan (Figure 7.1). Intensive surface survey, in conjunction with subsurface testing and consultation with local collectors, resulted in the identification of 72 archaeological sites within the Harris Sandhills of central Saskatchewan (Epp 1986). These sites range in age from the Early Precontact period through to the Late Precontact period based on the recovery of diagnostic projectile points. A total of 129 components are represented within the 72 sites, and consist of four Early Precontact period components, 80 Middle Precontact period components, and 45 Late Precontact period components (Epp 1986). The Harris Sandhills survey resulted in the identification of components associated with Paleoindian (n=4), Mummy Cave (n=2), Oxbow (n=15), McKean

Series (n=21), Pelican Lake (n=17), Besant (n=25), Avonlea (n=19), Prairie Side-Notched (n=23), and Plains Side-Notched (n=3) projectile point styles (Epp 1986).

Investigation of the Great Sand Hills of southwestern Saskatchewan resulted in the identification of 68 sites dating from the Early Precontact period through to the Protohistoric period (Epp and Johnson 1980). Single component and multicomponent sites were identified through survey, testing, examination of areas of disturbance (natural and man-made), and through consultation with local collectors. Epp and Johnson (1980) noted 221 components within the 68 sites from the Great Sand Hills survey, and stated that the majority of the components (94.57%) date to Late and Middle Precontact periods. The Early Precontact period is represented by components associated with Plainview (n=1), Agate Basin (n=4), Alberta (n=1), and Cody complex (n=3) projectile points. The Middle Precontact period components were classified based on the recovery of Early Side-Notched (n=7), Oxbow (n=21), McKean Series (n=27), Pelican Lake (n=39), and Besant (n=37) point styles. The Late Precontact period is represented by components containing Avonlea (n=16), Prairie Side-Notched (n=37), and Plains Side-Notched (n=25) projectile points while three components were assigned to the Protohistoric or Early Historic period based on the recovery of metal projectile points (Epp and Johnson 1980). Block excavation was conducted at a single site during the course of the Great Sand Hills study (Epp and Johnson 1980). Excavation of site EcOf 2 within four sections of the site resulted in the recovery of cultural materials associated with typical precontact campsite activities. Test Pit A1 contained faunal remains including unaltered and burned indeterminate bone fragments, and four elements tentatively identified as bison. The lithic assemblage included firebroken rock, debitage, an unidentifiable projectile point fragment, and a quartzite Oxbow point. Test Pit A2 revealed unaltered indeterminate bone fragments, a single radius fragment tentatively classified as deer, firebroken rock, debitage, and a relatively large number of ceramic sherds. At odds with the recovery of ceramics was the collection of a McKean projectile point, which had been reworked into a scraper, from Test Pit A2. Excavation of Test Pit B1 resulted in the recovery of unaltered indeterminate bone fragments, firebroken rock, debitage, and a uniface. Test Pit B2 contained unaltered and burned indeterminate bone fragments, firebroken rock, a biface, a Prairie Side-notched projectile point of Knife River flint, and a grey chert projectile point fragment which possibly represents a broken Prairie

Side-notched point. Unfortunately, the faunal remains collected from site EcOf 2 were too fragmentary to provide information regarding herd composition and seasonality of site-use. Local lithic materials dominate the assemblages with Knife River flint representing the only trade material. Excavation confirmed that the Great Sand Hills were used repeated throughout the archaeological record for precontact camping. Epp and Johnson (1980) suggest that the variety of resources found within the sandhills and the topography which was ideal for hunting allowed for year-round use of the area and for the consistent use of the region throughout the precontact period. They also recognized that concentrations of archaeological sites exist along the periphery of the Great Sand Hills and near major waterbodies within the sandhills. Epp and Johnson (1980) noted a higher frequency of sites within the sandhills to that exhibited in an area of equal size within the surrounding grasslands and concluded that

> the Great Sand Hills were preferred for settlement over the surrounding prairies because of the greater variety and , hence, stability of resources found in the sand hills environment (Epp and Johnson 1980:128)

Archaeological investigation conducted in conjunction with this thesis has confirmed the repeated use of sandhills within Saskatchewan. Sites EgNn 9 and EgNo 23 have revealed multiple occupations of the Douglas Park Sandhills (Figure 7.1) dating from the Late Precontact period into the Middle Precontact period. Cultural materials were identified in buried contexts and as surface finds, especially at site EgNo 23 which is located in a cultivated field. Investigations at site EgNn 9 have revealed Oxbow, Pelican Lake, Sandy Creek, Besant, Avonlea, and Late Precontact triangular projectile point styles while site EgNo 23 has produced projectile points of the McKean, Duncan, Hanna, Pelican Lake, Besant, Avonlea, and Late Precontact archaeological cultures. Likewise, thirty-seven archaeological sites ranging in age from the Early Precontact to the Historic periods have been recorded within the Manitou Sand Hills (Figure 7.1) based on information compiled by the Manitou Sand Hills Integrated Resource Management Planning and Advisory Committee (1996). Historical resource impact assessments conducted prior to oil and gas development within the Manitou Sandhills of west central Saskatchewan have identified artifact scatters and artifact finds associated with precontact occupation of the sandhills, as well as an historic Cree settlement (Manitou Sand Hills Integrated Resource Management Planning and Advisory Committee 1996).

The inclusion of the resources provided by the anomalous environments of the sandhills across the Great Plains throughout the archaeological record has also been confirmed through the excavation of single component sites. Late Precontact period sites from sandhill environments include the McIntosh site (Koch 1995) located within the Nebraska Sandhills (Figure 7.1), the Tschetter site (Prentice 1983) located within the Dunfermline Sandhills (Figure 7.1), and the Jackson, Bradshaw, and Twin Fawn sites (Playford 2001) located with the Lauder Sandhills (Figure 7.1). The Rousell site, located within the Dunfermline Sandhills (Figure 7.1) dates to the Avonlea phase and, while excavation revealed small quantities of typical campsite debris, no information regarding season of use or resources harvested could be determined (Dyck 1972). The Hartley site, located along the northern edge of the Moose Wood Sandhills (Figure 7.1), has revealed campsite components dating to the Avonlea and Old Women's phases (Clarke 1995). Communal bison hunting during the Besant phase has been identified at the Melhagen site (Ramsay 1991) and the Fitzgerald site (Hjermstad 1996) located, respectively, within the Douglas Park Sandhills and Moose Wood Sandhills (Figure 7.1). The Gowen sites represent utilization of the northern edge of the Moose Wood Sandhills (Figure 7.1) during the Middle Precontact period (Walker 1992). Utilization of the Dunfermline Sandhills (Figure 7.1) during the Oxbow phase has been revealed during excavation of the Harder site (Dyck 1997) and the Carruthers site (Dyck 1972). Excavation of the Carruthers site revealed the typical array of materials from precontact campsite activities, however, the seasonality of site-use nor the range of game species hunted could be determined (Dyck 1972). The recovery of Oxbow projectile points from disturbed sediments at the Rousell site, also located within the Dunfermline Sandhills (Figure 7.1), suggests that the site was used during both the Oxbow phase and the Avonlea phase (Dyck 1972).

7.4 Summary

Precontact inhabitants of sites EgNn 9 and EgNo 23 were able to access the resources of the 'anomalous' ecosystems associated with the Douglas Park Sandhills, and the South Saskatchewan and Qu'Appelle river valleys. The Douglas Park Sandhills provided stable, varied, and year-round resources which complemented the resources of the adjacent grasslands ecoregion. The sandhills provided an ideal setting for the communal hunting of bison through use of the pound and surround methods, as well as small-scale hunting using traps and stalking. The sites also

display the varied degrees of faunal preservation present within sandhill environments. Few of the occupations contained faunal specimens which could be identified as to species and, therefore, could not provide information regarding the range of resources utilized within the Douglas Park Sandhills. Seasonality of site-use could be determined in regards to the McKean Series kill at site EgNo 23, but the sample recovered from the Pelican Lake kill event was too small to confidently determine herd composition. Excavation of archaeological sites within other sandhills systems across the Great Plains have provided evidence of the year-round use of sandhills while studies regarding bison herd migration patterns suggest that bison were available to precontact populations year-round. Sites EgNn 9 and EgNo 23 have revealed multiple occupations of the sandhills and the recovery of projectile points allowed for the relative dating of some of the occupations. Archaeological investigations of sandhills across the Plains indicate that sandhill environments formed a part of precontact seasonal rounds beginning during the Paleoindian period and extending into historic times. Subsistence and settlement strategies targeting the various mammalian, avian, and botanical species (as well as the lithic resources) provided by the Douglas Park Sandhills would have been supplemented by the ceremonial / spiritual significance of the region. The resources available within the Douglas Park Sandhills would have allowed for demographic aggregation for large-scale communal harvesting of the various resources available within the area, and for the conduct of the frequently associated social and spiritual ceremonies held when human populations gathered in large numbers.

The environment of southern Saskatchewan and the region surrounding sites EgNn 9 and EgNo 23 is not and has never been static. The natural ecology of the Moist Mixed Grassland Ecoegion has been altered significantly with approximately 80% of the ecoregion currently under cultivation (Acton et al 1998). Agricultural expansion has resulted in the degradation of 95% of the parklands, 70% of the grasslands and 50% of the wetlands across the province as a whole (Smith 1999). The absence of key elements of the grasslands ecosystem, including bison migration and wildfires, has disrupted the patterns of vegetation. A survey conducted of historic township plats of southern Saskatchewan indicates a shift in vegetation patterns since the 1880's. Early maps show very little woodland in the vicinity of sites EgNn 9 and EgNo 23 with woodlands confined to the river valleys. However, recent township plats

show the area as being parkland (Archibold and Wilson 1980). Modern human influences have also limited the presence of most of the large mammal species, namely the bison, which characterized the grasslands ecosystem. As such, it is highly unlikely that the current environmental setting of sites EgNn 9 and EgNo 23 is identical to the conditions that were present during precontact utilization of the area. Yet with all the influences of modern land use in the area, the grasslands have maintained their diversity and the sandhills remain islands of relatively undisturbed and diverse vegetation and animal life. The Douglas Park Sandhills would have provided the resources and topography ideal for precontact communal harvesting. In addition to the diverse and reliable array of natural resources available within the sandhills, the spiritual significance of the region would have attracted precontact populations to the 'ecological island' of the Douglas Park Sandhills.

CHAPTER 8
THE PELICAN LAKE AND BESANT PHASES

Archaeological investigation attempts to bring life to the cultural materials recovered during excavation and survey. Human-made or utilized objects are examined in an attempt to understand their role in past lifeways. Cultural materials are classified with the goal of establishing spatial, temporal and/or cultural patterns. Archaeologists have used the distribution of such formal variations in material culture as design motifs, vessel shape, and projectile point morphology, in conjunction with evidence of social practices such as burial patterns and subsistence strategies, to trace past cultural development and contact. The establishment of taxonomic units is crucial as "human behavioral data must be placed in defined contexts of time and space ... before they can be used to reconstruct cultures, to reconstruct history, or to test theories" (Adams and Adams 1991:9). Taxonomic systems are developed and revised as more data from the archaeological record is collected but as Thomas Foor states "[o]ne classification scheme is better than another only to the extent that it better illustrates causal relationships and explains cultural behavior" (1985:124).

8.1 Archaeological Classification

Archaeological classification aims to use the analysis of cultural materials recovered from archaeological sites to define artifact assemblages with specific temporal and spatial occurrences. These discrete assemblages in turn are used to define 'archaeological cultures' which have been used to establish culture chronologies. The term 'archaeological culture' has been described as a neutral, ideology-free term for ethnic groups or distinct social entities (Jones 1997). MacEachern (1998) has stated that "a generative link is more or less explicitly assumed between some human group in the past and a particular material ensemble [with the implication being] that the spatial and temporal extent of the artifact suite ... corresponded to the spatial and temporal extent of a particular human society"

(MacEachern 1998:107). The archaeological record of the Great Plains shows a remarkably stable adaptation to the region, with new innovations and the introduction of new technologies to a relatively stable cultural assemblage. Michlovic (1986) states that "the persistence of a basic economic pattern must indicate some substantial degree of cultural stability" (Michlovic 1986:211). Michlovic (1986) views this cultural stability as positive and refutes the claims of other scholars that the limited array of change within the material culture of Plains assemblages implies a lack of progress or cultural evolution.

Projectile points have served as a major cultural marker for the classification of assemblages recovered throughout the Great Plains cultural region. The stylistic variations displayed by projectile points have been used to establish the culture chronology of the Plains, with points serving as time-sensitive diagnostics charting precontact utilization of the Plains through time and space. While other cultural materials, such as pottery, are more malleable and able to transmit more information regarding cultural preferences, projectile points have the advantage of being durable, bearing a number of discrete and measurable attributes, and being present at all types of archaeological site (i.e. campsites, kill sites, burials, tipi rings, rock art locales). Projectile points must be sharp enough to penetrate the hide of a game animal, strong enough to resist shattering on impact, be aerodynamic, and be configured so as to allow for hafting onto a spear, dart or arrow shaft. Knecht states that there is "no single optimum design for projectile points" (Knecht 1997:200) but several functional criteria must be met. She identifies these criteria as durability, maintainability, and use-efficiency which "will be determined by several factors including morphology, haft design, relative proportions of projectile point and shaft, projectile mass, and velocity and kinetic energy with which the projectile makes contact with the target" (Knecht 1997:200,201). Once functional criteria have been met the flintknapper is able to impart a degree of culturally specific style resulting in a relatively limited range of projectile point styles.

On the Great Plains, these projectile point styles have been named for the area in which they were first identified, and frequently the projectile point name has been given to the archaeological culture associated with the point style. In general, taxonomic systems across the Great Plains consist of a series of archaeological

cultures exhibiting specific temporal ranges and relatively large spatial distributions. Regardless of the specific nomenclature utilized by researchers, the Great Plains culture chronology has been divided into three general time periods : the Early Precontact Period characterized by lanceolate projectile points and the spear ; the Middle Precontact Period characterized by notched projectile points and the atlatl and dart ; and the Late Precontact Period with smaller projectile points, the bow and arrow, and pottery (Foor 1985). On the Northern Plains the Middle Precontact Period has been subdivided into a series of archaeological cultures including the Mummy Cave Series, the Oxbow Complex, the McKean Series, the Pelican Lake phase, and in certain taxonomic systems, the Besant phase.

The following sections consist of a brief overview of the Pelican Lake and Besant phases which are the focus of this thesis. Each overview includes a summary of archaeological sites from the Great Plains which have been classified as Pelican Lake and Besant based on the recovery of diagnostic projectile points. Also included is a discussion of the variants associated with both archaeological cultures. Tables containing all of the radiocarbon dates discussed in sections 8.2 and 8.3 are provided in Appendix C.

8.2 Overview of the Pelican Lake Phase

Radiocarbon dates obtained from Pelican Lake sites across the Northern Plains range from approximately 3710 ± 70 years BP to 1150 ± 100 years BP (Morlan 2005). Careful evaluation of these dates and elimination of problematic results has led Dyck and Morlan (2001:121) to propose a calibrated time span for the Pelican Lake phase of 1850 B.C. to A.D. 350. The phase has been classified as the Pelican Lake Complex of the Middle Plains Indian Period (Dyck 1997[1983]), the Pelican Lake Phase of the Late Middle Prehistoric Period (Reeves 1983, Vickers 1986), and the Pelican Lake cultural horizon of the Late Plains Archaic / Late Middle Prehistoric Period (Frison 1991). Diagnostic of the time period are projectile points which display "sharply barbed corner notching and a triangular form that is much like a stylized Christmas tree; the sharp points on the blade and corner edges of the notches are particularly distinctive" (Kooyman 2000:122).

Archaeological sites dating to the Pelican Lake phase, based on the recovery of diagnostic projectile points or absolute dating of radiocarbon samples, have been identified across the Northern Plains. Data compiled by Joan Damkjar of the Heritage Resource Management Branch of Alberta Community Development and Kim Weinbender of the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation in May of 2004 includes 715 Pelican Lake find locales in the province of Alberta and 798 Pelican Lake find locales in the province of Saskatchewan. The data includes Pelican Lake sites across the plains regions of both provinces, as well as sites located in the parkland and boreal forest regions of each province and the mountains of Alberta (Figure 8.1). The highest density of sites corresponds with the southern portion of each province. This apparent intensity of use by precontact populations may, in fact, reflect a combination of precontact settlement patterns and the amount of modern development within the regions. The southern portions of both provinces exhibit high levels of industrial and residential development and, correspondingly, high levels of archaeological investigation and precontact site identification. Review of archaeological site forms indicates a range of site types associated with the Pelican Lake phase. Pelican Lake projectile points have been recovered as isolated finds, and in association with artifact scatters, stone feature sites, campsites, killsites, burials, and rock art sites. Likewise, Pelican Lake projectile points have been recovered from single component and multicomponent sites across both provinces.

8.2.1 Pelican Lake Sites in Saskatchewan

The Pelican Lake phase was first defined by Boyd N. Wettlaufer at the Mortlach site in central Saskatchewan (Wettlaufer 1955). The Mortlach site produced finely finished projectile points, as well as smaller flake points, and artifact photograph plates show forms that are consistent with dart and arrow-sized points. The Mortlach site revealed four possible Pelican Lake phase occupations, as well as mixed occupations which produced Pelican Lake points in association with Besant points, Caron points, and other side notched point styles (Wettlaufer 1955). Other multicomponent campsites from Saskatchewan which contain Pelican Lake occupations include the Long Creek site, the Sjovold site, and sites within Wanuskewin Heritage Park. A recent re-analysis of the Long Creek site of southern Saskatchewan has clarified the Pelican Lake occupation of the region (Bryant 2002).

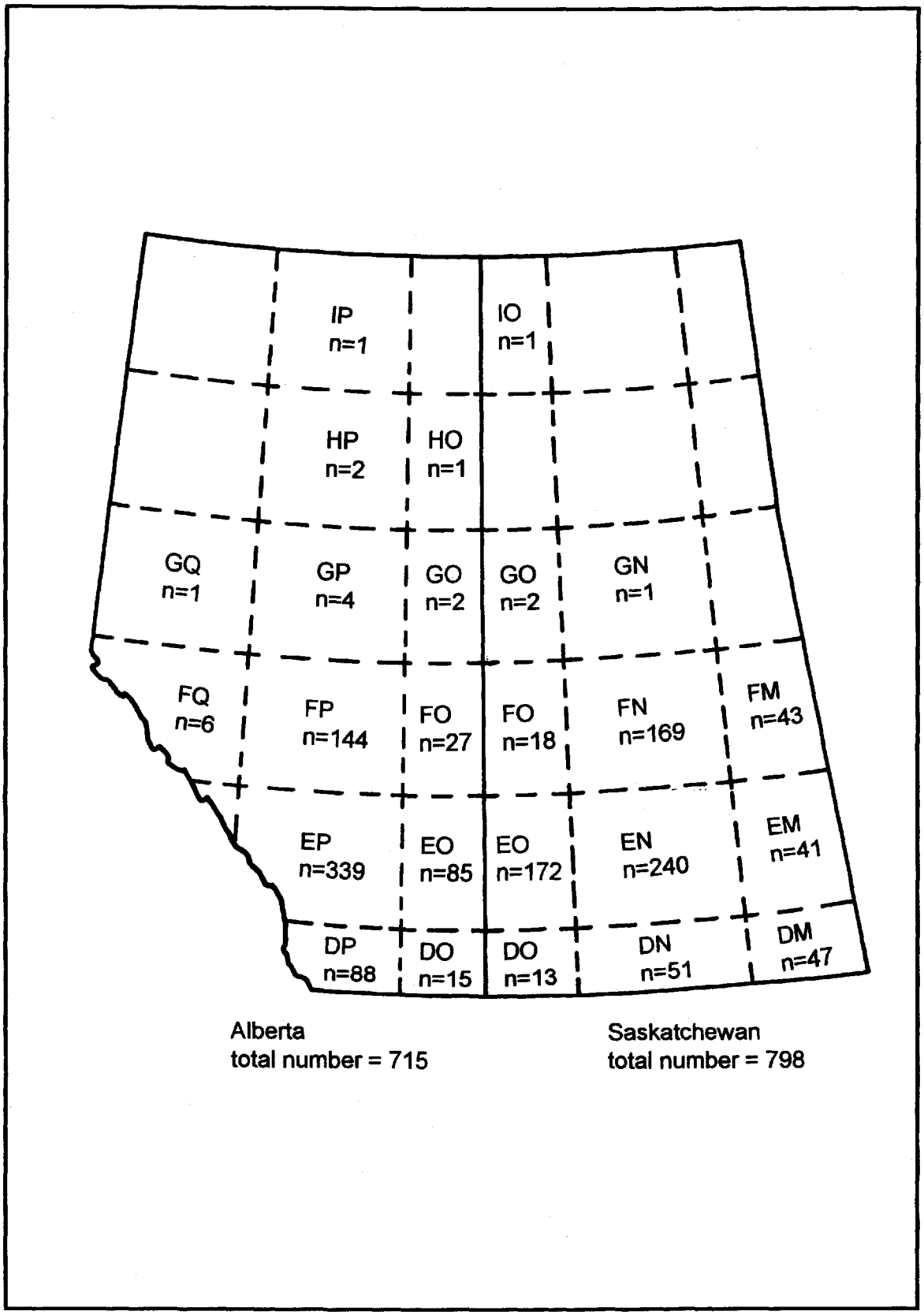


Figure 8.1 Pelican Lake Phase locales from across Saskatchewan and Alberta by Borden Block (data compiled in May 2004).

Byrant (2002) suggests that the Pelican Lake occupation identified in level 4 represents two separate uses of the site during the Pelican Lake phase, with one occupation associated with a bison kill event which resulted in the butchering of at least six animals. Six Pelican Lake projectile points are illustrated and display a range of sizes suggesting both dart and arrow projectiles. Radiocarbon dates from the Pelican Lake levels at the Long Creek site place level 4A at 2243 ± 100 years BP while level 4B dates to 3708 ± 69 years BP (Bryant 2002). Bryant (2002) also notes that the original excavators recorded a unique bison skull feature consisting of a fractured skull placed so as to rest on the occipital region and the tips of the horn cores. The skull was not available for further analysis to determine if further cultural modifications were present. Excavation of the uppermost occupation of the Long Creek site also resulted in the recovery of Pelican Lake and Besant projectile points, however, these points represent intrusive elements in association with the Late Precontact Period occupation of the site (Bryant 2002).

The Sjovold site of central Saskatchewan contains at least two Pelican Lake occupations, as well as mixed occupations containing Pelican Lake projectile points (Dyck and Morlan 1995). The recovery of Pelican Lake projectile points from layer XIX and XX provide a relative date for these occupations of the Sjovold site while the recovery of Pelican Lake points from an upper occupation indicates post-occupational mixing of cultural materials. Radiocarbon dating of layer XIX produced a date of 3275 ± 160 years BP while layer XX produced a date of 3595 ± 150 years BP (Dyck and Morlan 1995). Of interest is the fact that the lowest Pelican Lake occupation contains a projectile point which is smaller (arrow-sized) than the points recovered from the overlying Pelican Lake occupation. Excavation within Wanuskewin Heritage Park located three kilometers north of the city of Saskatoon has also resulted in the identification of multicomponent campsites containing Pelican Lake occupations. The Thundercloud site revealed a mixed occupation containing a possible arrow-sized Pelican Lake projectile point. Occupation level 3 at Thundercloud contained four Besant projectile points, two Avonlea triangular points, as well as two large side notched points and a small corner notched point (Mack 2000). The Newo Asiniak site revealed a mixed occupation (level 3) containing three Besant projectile points and a single Pelican Lake point, which produced a radiocarbon date of 2235 ± 70 years BP (Kelly 1986). Level 4 of the Newo Asiniak site was assigned to the Un-named

Complex associated with the Pelican Lake phase and dates to 3025 ± 250 years BP (Kelly 1986). The projectile point recovered from level 4 displays the triangular body typical of Pelican Lake points, however, notching is not strongly diagonal and while the tool's shoulders are pronounced they are not barbed.

The lowest occupation at site EdNh 35 dates to the Pelican Lake phase based on the recovery of a Pelican Lake projectile point and a radiocarbon date of 3678 ± 80 years BP (Cloutier 2004). Excavation revealed three hearths in association with typical campsite debris. Site EdNh 35, located in the Moose Jaw River valley northeast of the city of Moose Jaw, produced lithic debitage, cores, tools, and faunal remains including burned and calcined bone. Upper occupations at site EdNh 35 date to the Besant and Avonlea phases (Cloutier 2004). Excavation conducted in association with this thesis has resulted in the identification of a multicomponent campsite, site EgNn 9, which contains at least one occupation dating to the Pelican Lake phase based on the recovery of diagnostic projectile points. Site EgNo 23 produced evidence of a bison kill event (possibly a pound incorporating the natural topography of the sand dunes) and an associated campsite and processing area dating to the Pelican Lake phase.

A Pelican Lake projectile point was found in association with human remains at the Bracken Cairn site of southeastern Saskatchewan (Walker 1982). The burial contained the secondary interment of five individuals including a male aged 36 to 46 years, a female aged 44 to 54 years, two immature individuals (a one year old and a near-term fetal or neonate), and a fifth individual represented by a single left femur. The interment included shell beads, pendants, and gorgets, as well as faunal remains and lithic tools. Among the lithic tools was a single Pelican Lake projectile point displaying a triangular body, wide corner notches, and a convex base (Walker 1982). The burial at Bracken Cairn was radiocarbon dated at 2465 ± 85 years BP (Walker 1982).

Archaeological investigation of the Quill Lakes region of central Saskatchewan has resulted in the identification of 21 collection locales containing a total of 169 Pelican Lake projectile points (Novecosky 2002). The projectile points were collected from surface or disturbed contexts throughout the Quill Lakes region and display the

full range of Pelican Lake projectile point styles, including both dart and arrow-sized forms. A compilation of data from archaeological sites associated with the Lake Diefenbaker reservoir of central Saskatchewan has identified 22 multicomponent sites containing Pelican Lake phase occupations and an additional two sites which represent single component Pelican Lake occupations of the region (Himour 1997). Likewise, investigation of the northern boreal forest region surrounding Black Lake, in northern Saskatchewan, has revealed archaeological sites containing projectile points similar to Pelican Lake points of the Plains (Minni 1976). Projectile points recovered from the surface of two sites (lgNj 11 and lgNi 6) have been classified as Pelican Lake and have been postulated as evidence of hunting forays by Plains hunters from more southern regions of the province (Minni 1976:57).

Review of the archaeological database of site forms submitted to the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation has identified Pelican Lake sites across Saskatchewan (Figure 8.1). The Canadian Archaeological Radiocarbon Database lists nine radiocarbon dates obtained from Pelican Lake phase sites across Saskatchewan ranging in age from 3710 ± 70 years BP to 2230 ± 100 years BP (Morlan 2005). Accelerator mass spectrometry (AMS) samples from site EgNn 9 failed to provide additional data as the samples proved to be contaminated. A radiocarbon date of 1880 ± 50 years BP was obtained from the Pelican Lake phase bone bed associated with the Main Block at site EgNo 23. The date is more recent than other Saskatchewan Pelican Lake dates but falls within the range exhibited for sites within the greater Plains region.

8.2.2 Pelican Lake Sites in Alberta

Review of the archaeological database of site forms submitted to the Heritage Resource Management Branch of Alberta Community Development indicates the presence of Pelican Lake projectile points at a wide array of sites including Writing-on-Stone rock art site, Majorville medicine wheel, Head-Smashed-In buffalo jump, and Old Women buffalo jump. Pelican Lake phase sites have been identified across the province (Figure 8.1) and 56 radiocarbon dates from sites across Alberta range from 3670 ± 130 years BP to 1150 ± 100 years BP (Morlan 2005).

Pelican Lake projectile points have been recovered from numerous multicomponent campsites across the province. Excavation prior to construction of the Oldman River Dam in southern Alberta resulted in the identification of Pelican Lake components at sites DjPl 13 and DjPm 36 on the Oldman River, and sites DjPm 44 and DjPm 228 on the Castle River (Van Dyke et al 1991). The upper two occupations at the Cactus Flower site in central Alberta date to the Pelican Lake phase (Brumley 1975). The lower Pelican Lake occupation contained flake points which display rounded blade edges and corner notches suggestive of the Pelican Lake phase though not typical (Brumley 1975). The Saahkomaapina site located on Little Sand Hill Creek in central Alberta revealed five possible Pelican Lake occupations (Head et al 2003). Excavation of Block 3 exposed a mixed occupation containing McKean projectile points and a possible reworked Pelican Lake point. The occupation above this mixed McKean / Pelican Lake component contained a corner notched projectile point base classified as Pelican Lake and a flake point displaying a triangular body with shallow side notches that may represent a Besant point. The 2m x 2m excavation block beside Block 3 revealed a single Pelican Lake occupation containing a diagnostic Pelican Lake projectile point. Block 4 contained two separate Pelican Lake occupations containing complete and broken projectile points displaying corner notches typical of the phase (Head et al 2003). The lower Pelican Lake occupation produced a Pelican Lake projectile point and a radiocarbon date of 3350 ± 90 years BP, but also contained a Hanna point. The upper Pelican Lake occupation in Block 4 at the Saahkomaapina site dates to 3270 ± 90 years BP and contained a possible Pelican Lake projectile point and a flake point (Head et al 2003). Multicomponent campsite deposits associated with the Scapa Ribstone in central Alberta also revealed Pelican Lake phase occupations. Excavation of the fourth basin at site ElPa 1, located just below the ridge top which held the ribstone, revealed two separate Pelican Lake occupations (one mixed with Besant projectile points) and a third lower occupation containing a Sandy Creek projectile point (Hanna and Neal 1992). Pelican Lake projectile points were also recovered during excavation of a multicomponent campsite located within the Rocky Mountains near Jasper. Site FfQh 27 contained typical Pelican Lake projectile points, as well as variants displaying wide corner notches and almost stemmed bases (Kulle and Neal 1998b).

Stone circle sites containing Pelican Lake phase projectile points have also been identified across Alberta. Archaeological site EkOx 9 revealed two Pelican Lake occupations associated with a stone circle overlooking Dowling Lake in central Alberta. The lowest Pelican Lake occupation contained a typical Pelican Lake point base while the upper occupation revealed a corner notched projectile point with a reworked body which has been classified as a reworked Pelican Lake point (Hanna and Neal 1992). Buried stone circles containing Pelican Lake projectile points were identified during excavation prior to construction of the Oldman River Dam at site DjPl 11 and DjPm 98 (Van Dyke et al 1991). The Bow Bottom site located on the Bow River within Calgary city limits also contained buried stone circles associated with Pelican Lake projectile points (Van Dyke 1982, Ronaghan and Landals 1983). Fourteen stone circles were excavated during the 1980 field season and revealed a total of 13 dart-sized Pelican Lake points, three arrow-sized Pelican Lake points, four Besant projectile points, six flake points, and a single Samantha point (Van Dyke 1982). Ring 2 contained both a dart and arrow-sized Pelican Lake point while Ring 9 contained a Pelican Lake dart point, a Pelican Lake arrow point, and a Besant dart point (Van Dyke 1982). The winter campsite was excavated again during 1981 and an additional four stone circles were identified, each of which contained a Pelican Lake or Sandy Creek projectile point (Ronaghan and Landals 1983).

Excavation prior to construction of the Oldman River Dam resulted in the identification of a major summer bison kill at the Smyth site on the Crowsnest River (Landals 1991). Campsite and processing activities were identified mid-terrace while kill deposits were revealed at the base of a steep slope leading down to the river. The kill deposits represent the repeated use of the slope for the communal hunting of bison, possibly with a containment feature at the base of the slope. The site represents a large horizontal distribution of cultural materials over a relatively tight vertical / temporal range. Radiocarbon dates obtained from across the Smyth site date range from 2220 ± 110 years BP to 2880 ± 100 years BP (see Appendix C). Projectile points recovered during excavation include 'classic' Pelican Lake points, as well as variants which resemble Sandy Creek and Besant points (Landals 1991). The Smyth site also revealed two ceremonial features including two stacked bison skulls and a "ovate, hollow centred circle of unmodified rounded river cobbles" with no evidence of ash, charcoal nor fire reddened rocks (Landals 1991:219). At the

northern edge of the oval rock-lined basin was a sandstone slab placed over a complete, finely made Pelican Lake projectile point of Kootenay argillite. The feature has been identified as an offering cairn constructed within the processing area of the site (Landals 1991).

Archaeological investigation of the Crowsnest Pass of southern Alberta revealed 51 sites containing Pelican Lake phase occupations (Duke 1978). Pelican Lake projectile points were recovered from surface collections, stone circle sites, buried multicomponent campsites, lithic workshop locales, and kill sites within the Crowsnest Pass. Faunal materials recovered from the sites suggest year-round use of the region; with fetal bison remains recovered from site DjPn 9 indicating winter occupation of the area and fish remains recovered from site DjPp 3 suggesting summer use of the region. A single cairn site, DjPn 8, was reported by locals as having contained a Pelican Lake projectile point. Duke (1978) suggests that the 15 locales associated with the Livingston quarries were utilized throughout the Pelican Lake phase and "[a]lthough these sites do not contain any time-diagnostic points, they are all associated with the quarrying of Etherington chert, a major component in Pelican Lake assemblages in the Crowsnest Pass "(Duke 1978:77).

8.2.3 Pelican Lake Sites in the Northern United States

The Pelican Lake phase, as seen in the northern states, has been classified as a component within a cultural chronology similar to the system currently utilized in the Canadian portion of the Great Plains (namely a phase belonging to the Middle Precontact Period). Sites belonging to the Pelican Lake phase have been identified throughout Wyoming and Montana, classified as Pelican Lake based on the recovery of diagnostic corner notched projectile points. Excavation at Daugherty Cave in northern Wyoming revealed a mixed occupation containing Pelican Lake projectile points and a single intrusive McKean point (Frison 1968). Both dart and arrow-sized projectile points classified as belonging to the Pelican Lake phase were recovered from the cave. The unique preservation conditions afforded by the cave setting allowed for the recovery of a remarkable array of cultural materials including basketry, a hide moccasin, a hoof rattle, and numerous worked wood, bone, and antler items. These latter items provide valuable insight into methods of hafting lithic tools onto a variety of handles and foreshafts (Frison 1968). Investigation of the Wedding of the

Waters Cave, also located in northern Wyoming, identified four occupations of the cave in a relatively tight stratigraphic sequence (Frison 1962). Two of the cave's occupational levels contained corner notched projectile points with the upper occupation containing smaller (arrow-sized) corner notched points with slightly serrated edges. The lower Pelican Lake occupation produced ten dart-sized projectile points and four socketed wooden dart foreshafts, one of which retained a corner notched point still secured by sinew binding (Frison 1962). Radiocarbon dating of the lower Pelican Lake occupation at Wedding of the Waters cave dates the occupation to 1620 ± 165 years BP (Frison 1962).

Pelican Lake projectile points have been recovered at bison kill sites within Wyoming. The Kobold site, located in northern Wyoming, represents a bison jump and associated rock shelter (Frison 1970). The kill deposits contain three separate Pelican Lake phase components while artifact illustrations indicate that both dart and arrow-sized projectile points were recovered (Frison 1970). The Ruby site, a Besant phase kill site also located in northern Wyoming, produced dart and arrow-sized Pelican Lake projectile points in lower deposits within the kill locale (Frison 1971). Frison (1991) also identifies a cremation burial in the Wind River Canyon of northern Wyoming as dating to the Pelican Lake phase and notes that excavation at the Medicine Lodge Creek site has revealed a sequence of projectile points displaying the full range of variation in style associated with the Pelican Lake phase. Sixteen radiocarbon dates obtained from Pelican Lake sites within Wyoming range from 3540 ± 220 years BP to 1605 ± 130 years BP (Morlan 2005).

The Pelican Lake phase is well represented across Montana and a compilation of 60 radiocarbon samples obtained from sites across the state range from 3610 ± 290 years BP to 1230 ± 160 years BP (Morlan 2005). Foor (1982) analyzed the data from 220 Pelican Lake sites across the region which he identified as the Northwestern Plains ; from Alberta, Saskatchewan, Manitoba, Montana, Wyoming, North Dakota, South Dakota, Nebraska, and Colorado. The data includes information from 150 sites from Montana, ranging from isolated finds and surface scatters to campsites and kill sites (including single component and multicomponent sites). Excavation at Pictograph Cave, located in southeastern Montana, revealed two campsite occupations containing corner notched Pelican Lake projectile points (Foor 1982).

The Pilgrim Site in western Montana represents a stone circle site and four of the excavated rings contained corner notched points (Foor 1982). The Mud Knob site and site 24PR1033 consist of surface scatters of lithic debitage and tools in association with Pelican Lake projectile points (Foor 1982). Foor (1982) also notes that the Keaster site in north central Montana represents the first excavated bison pound dating to the Pelican Lake phase. Radiocarbon dating of the Keaster site produced a date of 1945 ± 25 years BP (Foor 1982) In regards to the Pelican Lake phase, Foor (1982) states that adaptation to the Great Plains environment produced "a community settlement pattern marked by low overall population density, small and scattered settlements, and a uniform material culture throughout the area" (Foor 1982:13). The archaeological sites from across the Northwestern Plains included in Foor's study reveal the use of a wide array of plant and animal resources and the year-round utilization of the region, with site use reflecting seasonal resource availability and the seasonal needs of the precontact populations. Foor defines the typical Pelican Lake projectile point as displaying "an expanding stem with deep, round notches extending diagonally from the junction of the base and lateral edges towards the center of the triangular shaped preform" (1982:26). He does note that many of the Pelican Lake sites across the Northwestern Plains also produced projectile points displaying an array of variations on this 'classic' form. Foor (1982) compiled a list of 50 radiocarbon dates from Pelican Lake sites across the Northwestern Plains ranging from 3540 ± 220 years BP to 1230 ± 160 years BP (see Appendix C).

8.2.4 The Pelican Lake Phase in the Northeastern Plains

The Northeastern Plains cultural region corresponds with the eastern edge of the Great Plains cultural area and includes the province of Manitoba, and the states of North Dakota, South Dakota, and Nebraska. Cultural assemblages recovered from sites within the Northeastern Plains are frequently discussed in reference to cultural chronologies defined for the adjacent Woodlands cultural area. The Pelican Lake phase has been classified as belonging to the Late Plains Archaic of the Northeastern Plains and sites assigned to the Late Plains Archaic have produced large and small corner notched projectile points (Gregg et al 1996). Projectile points resembling Pelican Lake points have also been recovered from sites assigned to the Early Plains Woodland phase of the Northeastern Plains (Gregg 1990). Cultural assemblages

recovered from sites within the Northeastern Plains frequently exhibit cultural contact with the adjacent Woodlands, namely through the presence of ceramics and adaptive strategies different than those seen on the 'true' plains. For instance, the Naze site (located in southeastern North Dakota) produced three small corner notched projectile points in association with a residential structure constructed of wooden posts and daub (Gregg 1990). Gregg (1990) notes that the un-typed corner notched projectile points would be classified as Pelican Lake points elsewhere on the Plains. Pottery was recovered in association with the corner notched projectile points and structure which is typical of Early Plains Woodland sites (Gregg 1990). The projectile points resemble those found on the Great Plains but the presence of a residential structure suggests a sedentary adaptation different from that of most Great Plains populations.

Thirteen radiocarbon dates from archaeological sites across Manitoba range from 3460 ± 100 years BP to 2145 ± 105 years BP while six dates from North Dakota range from 2740 ± 80 years BP to 2120 ± 90 years BP (Morlan 2005). Three samples from Pelican Lake sites in South Dakota range from 2475 ± 150 years BP to 1920 ± 120 years BP (Morlan 2005). Archaeological sites in Nebraska have produced Pelican Lake projectile points and five radiocarbon dates compiled from sites across the state range from 3100 ± 410 years BP to 2049 ± 180 years BP (Morlan 2005).

8.2.5 Pelican Lake Variants and Associated Complexes

Projectile points varying from the 'classic' Pelican Lake shape of a triangular body, sharply barbed shoulders, and diagonal or corner notches have been recovered from archaeological sites across the Great Plains. Reeves (1983) has used variations in attributes and measurements to divide the Pelican Lake phase into eight regional sub-phases. The Glendo, Badger, Upper Miles, Spring Creek, Keaster, Blue Slate Canyon, Mortlach, and Larter sub-phases "correspond in varying degrees to distinctive environmental areas of the Northern Plains" (Reeves 1983:76). The Mortlach sub-phase of the Pelican Lake phase corresponds with the Plains region of Saskatchewan and Alberta while the Larter sub-phase is associated with the province of Manitoba (Reeves 1983). In his summary of the precontact cultural sequence of southern Saskatchewan, Dyck (1997[1983]) defined two complexes as being associated with the Pelican Lake complex of the Middle Plains Indian Period. Dyck (1997[1983]) identified the Un-named complex and the Sandy Creek complex as

related, though distinct, cultural assemblages dating to a time frame similar to that of the Pelican Lake complex.

The Un-named complex was defined by the presence of "very straight-based lanceolate side-notched projectile points of medium size" (Dyck 1997[1983]:107) and, when first identified, was assigned to the middle of the Pelican Lake sequence. During initial discussion of the projectile point style Dyck (1997[1983]) suggested that the point style related to the expansion of Early Woodland peoples from Minnesota, Illinois, and Ohio into the Great Plains due to population pressures within their homelands. However, recent detailed examination of Un-named complex projectile points recovered from the Sjovold site has lead to the re-classification of the projectile point style. Dyck and Morlan (1995) now classify Un-named complex projectile points as Outlook Side-notched points and assign the cultural assemblage to the Besant phase, rather than the Pelican Lake phase. Dyck and Morlan (1995) classify the straight-based projectile points as one of three projectile point styles represented within the Besant phase (see section 8.3) and, therefore, the point style does not represent a separate cultural complex.

The second possible sub-phase associated with the Pelican Lake phase, the Sandy Creek complex, is defined by the presence of "side-notched basally-indented projectile points" (Dyck 1997[1983]:108). When first recognized within assemblages from southern Saskatchewan, the Sandy Creek complex was assigned to the middle of the Pelican Lake sequence and Dyck (1997[1983]) stated that Sandy Creek projectile points were distinguishable from Oxbow points solely by age and position within a cultural sequence. Summaries of the precontact cultural sequence of southern Alberta also identify the Sandy Creek variant. Vickers (1986) recognizes Sandy Creek as a distinct projectile point style which he believes represents an early form of Besant point. As such, Vickers (1986) identifies Sandy Creek as a sub-phase of the Besant phase although he notes that Sandy Creek points are frequently found in association with Pelican Lake occupations across the Plains. Reeves (1983) also notes that projectile points without corner notching appear in archaeological assemblages containing 'classic' Pelican Lake points. Reeves (1983) notes the presence of obtuse shouldered forms, which resemble Sandy Creek projectile points, in association with Mortlach and Larter components while 'true' Besant points are

found only in association with Mortlach components. Recent re-examination of Sandy Creek projectile points recovered from the Sjovold site has led Dyck and Morlan (1995) to classify the basally-indented projectile points as one of three point style associated with the Besant phase and, therefore, the point style does not represent a separate cultural complex. As such, both variants (Un-named and Sandy Creek) are now assigned to the Besant phase.

8.3 Overview of the Besant Phase

A recent compilation of 156 radiocarbon dates obtained from Besant sites across the Great Plains range from 3000 ± 80 years BP to 510 ± 80 years BP (Morlan 2005). On the Canadian Plains, Dyck and Morlan (2001:123-124) consider that while the Besant phase may have beginnings as early as 650 B.C., it was not well established until A.D. 50. The phase has been classified as the Besant Complex of the Late Plains Indian Period (Dyck 1997[1983]), the Besant Phase of the Late Middle Prehistoric Period (Reeves 1983, Vickers 1986), and the Besant Culture of the Late Plains Archaic / Late Middle Prehistoric Period (Frison 1991). Diagnostic of the time period are "lanceolate side-notched projectile points that are predominantly straight-based, but sometimes the base is slightly convex or slightly concave ... Notches are generally twice as broad as they are deep and are situated so that one edge of the notch is slightly above or even touching the basal edge" (Dyck 1997[1983]:115).

Archaeological sites dating to the Besant phase based on the recovery of diagnostic side notched points, or absolute dating of radiocarbon samples, have been identified across the Great Plains. Data compiled by Joan Damkjar of the Heritage Resource Management Branch of Alberta Community Development and Kim Weinbender of the Heritage Resources Unit of Saskatchewan Culture, Youth, and Recreation in May of 2004 includes 651 Besant find locales in the province of Alberta and 745 Besant find locales in the province of Saskatchewan. The data includes Besant sites across the plains regions of both provinces, as well as sites located in the adjacent parkland and boreal forest regions of each province (Figure 8.2). As with the data regarding Pelican Lake sites, the density of sites is more a reflection of the degree of industrial development and, therefore, archaeological investigation within each Borden block rather that a reflection of the intensity of precontact utilization of each region. Review of archaeological site forms indicates a range of site types

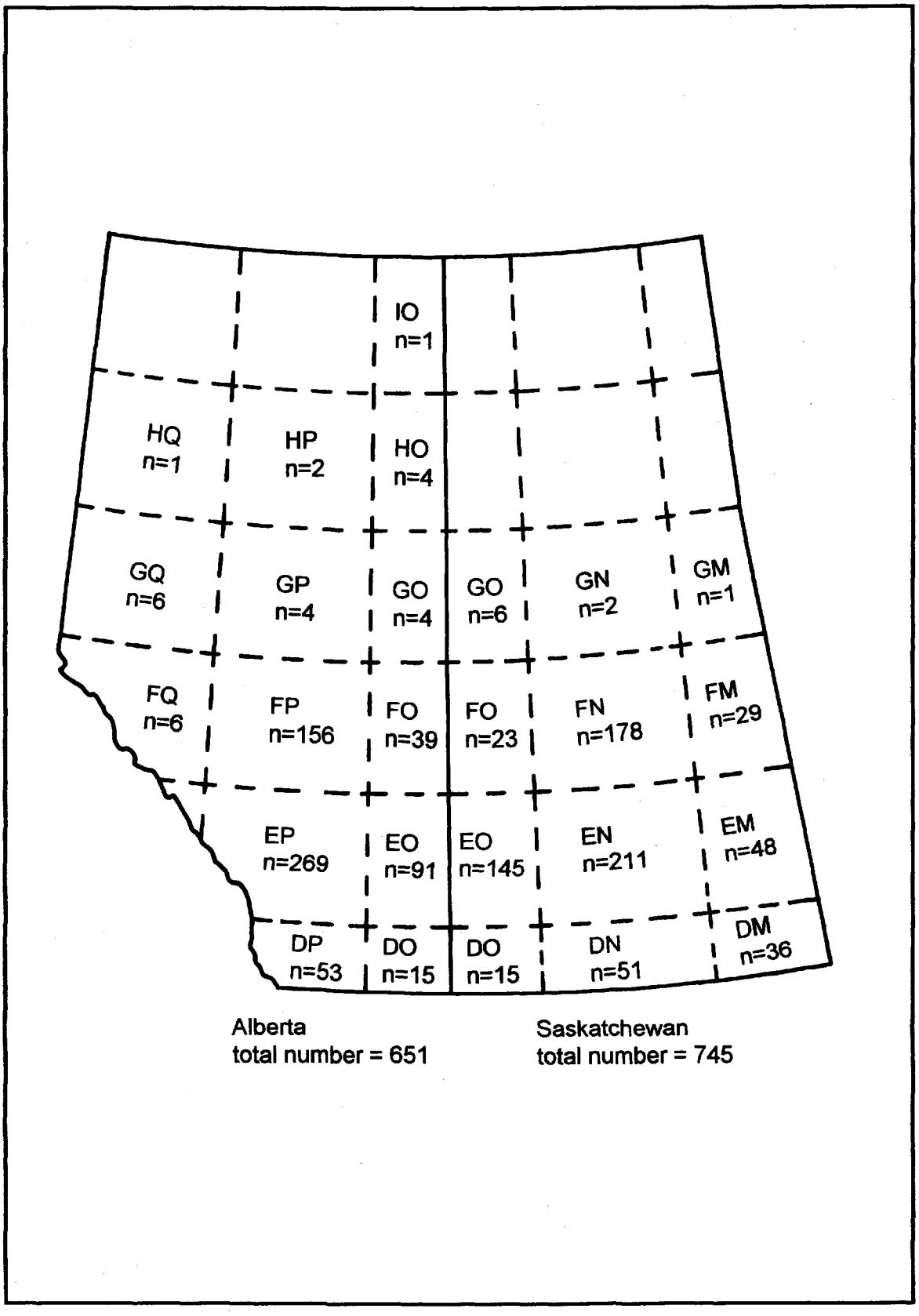


Figure 8.2 Besant Phase locales from across Saskatchewan and Alberta by Borden Block (data compiled in May 2004).

associated with the Besant phase. Besant projectile points have been recovered as isolated finds, and have been found in association with artifact scatters, stone feature sites, campsites, killsites, burials, and rock art sites. Likewise, Besant projectile points have been recovered from single component and multicomponent sites across both provinces.

8.3.1 Besant Sites in Saskatchewan

The Besant phase was first identified at the Mortlach site in central Saskatchewan and excavation revealed four occupations which were used to define the phase (Wettlaufer 1955). The Besant occupations produced projectile points described as "short and broad with shallow side notches and a slightly concave base" (Wettlaufer 1955:44). One of the Besant occupations revealed a series of post holes in a semi- circular pattern which Wettlaufer (1955) deemed suggestive of the lodge structures ascribed to the Mandan culture of North Dakota. None of the Besant occupations contained pottery. The artifact photograph plates of the projectile points recovered at the Mortlach site illustrate the mixed nature of the materials recovered and also indicate the beginning of the confusion regarding sub-phases associated with the Besant and Pelican Lake phases. While Wettlaufer's description of a typical Besant projectile point refers to a tanged-base projectile point none of the points illustrated in plate 6, the 'characteristic' Besant points from the site, exhibit a tanged base. Plate 5 which contains the Caron culture artifacts shows a tanged-based projectile point and a straight based form, both of which are listed as typical Caron points. Two of the four Besant occupations at the Mortlach site show Pelican Lake projectile points in association with Besant points (Wettlaufer 1955, plate 6 and 9) while a single 'Besant' occupation (plate 8) just shows a Pelican Lake point. The Sandy Creek artifact plate (plate 10) shows projectile points with poorly defined basal tangs, neither of which are as tanged as the Caron point in plate 5. Some of the confusion regarding projectile point styles may be due to the incorporation of cultural material from different excavation blocks into a single cultural occupation regardless of the distance between the blocks.

Excavation of the Sjovold site in central Saskatchewan revealed multiple occupations associated with the Besant phase (Dyck and Morlan 1995). Layer XIV, which Dyck and Morlan (1995) label as the arrival of Besant peoples to the site, dates

to 2500 ± 85 years BP. Layer XIV contained lanceolate side notched projectile points displaying rounded basal edges and straight to slightly concave bases which the authors classify as Outlook Side-notched points. This projectile point style was originally assigned to the Un-named complex of the Pelican Lake phase (Dyck 1997[1983]) but has been re-classified as an early style of Besant point, and may represent an early arrival of bow and arrow technology to the Northern Plains (Dyck and Morlan 1995). Excavation of layer XIII revealed two projectile points including a poorly finished point which may represent a unfinished Besant point and a projectile point fragment exhibiting a triangular body but lacking diagnostic basal elements. Layer XII of the Sjovold site is labeled as a Besant hunting campsite and has been radiocarbon dated to 2355 ± 105 years BP (Dyck and Morlan 1995). Projectile points recovered from layer XII exhibit a tanged appearance due to a broad concave base and side notches low on the form, and have classified as Sandy Creek points (Dyck and Morlan 1995). The Sandy Creek projectile point style was originally classified as characteristic of a sub-phase of the Pelican Lake phase (Dyck 1997[1983]) but has been re-classified as one of the point styles of the Besant phase (Dyck and Morlan 1995). Layer XI at the Sjovold site has been labeled a Bratton workshop by the authors and contained diagnostic projectile points which may relate to both the Pelican Lake phase and the Besant phase. Bratton points exhibit straight sides, side notches located low on the form, and a convex base (Dyck and Morlan 1995). In their discussion of layer XII, Dyck and Morlan (1995) indicate that concave-based Sandy Creek points and convex-based Bratton points represent two of the projectile point styles associated with the Besant phase but in their discussion of layer XI they suggest that Bratton points are more closely associated with the Pelican Lake phase. Layer X, located above these occupations, represents a mixed component at the Sjovold site. Excavation revealed two reworked Besant projectile points and two corner notched Pelican Lake points. Three radiocarbon dates were obtained from layer X and provided dates of 2340 ± 120 years BP, 2190 ± 140 years BP, and 2090 ± 165 years BP for the mixed component (Dyck and Morlan 1995).

The Long Creek site in southern Saskatchewan contains a Besant occupation which revealed pottery in association with 'classic' Besant projectile points (Bryant 2002). The artifact assemblage associated with level 3 of the Long Creek site contained ten body sherds which were too fragmentary to define decorative style.

Excavation revealed dart and arrow-sized Besant projectile points and a typical array of campsite debris including debitage, faunal remains, and lithic tools (Bryant 2002). Buried campsite deposits associated with the Besant phase were also identified at sites within Wanuskewin Heritage Park, north of the city of Saskatoon. The Thundercloud site (Mack 2000) and the Newo Asiniak site (Kelly 1986) revealed mixed occupations containing Pelican Lake projectile points and Besant points. Archaeological site EdNh 35 produced a mixed Besant / Avonlea occupation above a Pelican Lake occupation (Cloutier 2004). The compressed stratigraphy present at the site resulted in the mixing of cultural materials associated with the separate Avonlea and Besant occupations of the site. Excavation revealed cultural features including numerous bone uprights, small hearths, and a distinctive boiling pit in association with Besant, Samantha, and Avonlea projectile points. A total of 238 pottery sherds were recovered and some sherds were complete enough to assign to a specific ware. Most of the sherds displayed the fabric impressed exterior finish characteristic of Rock Lake Net/Fabric Impressed Ware associated with the Avonlea phase while a small number of sherds exhibited the cord-roughened exterior associated with Besant Ware (Cloutier 2004). Radiocarbon samples obtained from the closely associated upper occupations produced dates of 1378 ± 45 years BP and 1283 ± 60 years BP (Cloutier 2004). Excavation conducted in association with this thesis identified Besant phase occupations within the Douglas Park Sandhills. Archaeological investigation during the 2000 season identified two buried Besant occupations at site EgNn 9, on both the north and south sides of the pipeline right-of-ways which intersect the site. Excavation of Block 1 at site EgNn 9 revealed a major campsite occupation containing a hearth, faunal remains, debitage, and lithic tools dated to the Besant phase based on the recovery of a diagnostic projectile point. Likewise, excavation of the Main Block at site EgNo 23 revealed a typical array of artifacts associated with precontact campsite and processing activities which has been dated to the Besant phase based on the recovery of three Besant projectile points.

Archaeological surveys of central Saskatchewan have also revealed Besant occupations in association with various archaeological site types. Novecosky (2002) recorded archaeological collections associated with the Quill Lakes region of central Saskatchewan and identified 16 collection locales containing a total 254 Besant projectile points. The projectile points display the full range of styles associated with

the time period and also include both dart and arrow-sized points. No ceramics were recovered and Novecosky (2002) notes that the collections are dominated by locally available lithic materials. He also notes that Besant projectile points can easily be mis-identified as Early Side Notched points (and vice versa) and therefore if classification was questionable he excluded the projectile point and labeled it as non-diagnostic (Novecosky 2002). Himour (1997) recorded archaeological sites associated with Lake Diefenbaker in central Saskatchewan and indicates that the Besant phase is well represented within the region. Besant projectile points were recovered from surface scatters and multicomponent sites associated with the reservoir and Himour (1997) also notes that the assemblages are dominated by locally available lithic materials.

The Elma Thompson site in west-central Saskatchewan represents a stone circle site dating to the Besant phase (Finnigan and Johnson 1984). The site consists of a surface stone circle with a hearth identified outside of the ring on the east side and a rock filled pit revealed on the west side of the ring. The artifact assemblage consists of debitage, highly fragmented faunal remains, firebroken rock, and lithic tools. The recovery of two Besant projectile points provides a relative date for the stone circle while radiocarbon dating of bison bone produced a date of 1675 ± 145 years BP (Finnigan and Johnson 1984). The projectile points appear to represent arrow points with one form displaying a narrower body suggestive of Samantha points.

Bison kill sites dating to the Besant phase have also been identified within Saskatchewan. The Bakken-Wright site located in southwestern Saskatchewan represents a multicomponent bison jump and associated processing area (Adams 1975). The site had been damaged by amateur excavation, and site interpretation was also hampered by the lower degree of faunal preservation exhibited. Projectile points from the Besant, Avonlea, and Late Plains phases were collected by amateur excavators, however, no diagnostics were recovered during professional excavation (Adams 1975). The Melhagen site represents a major communal bison hunting and processing site located within the Douglas Park Sandhills (Ramsay 1991). Excavation of the Melhagen site revealed repeated use of the region during the Besant phase and one occupation contained a post hole which suggests the construction of at least

one pound structure at the site. Analysis of the remains of over 170 bison indicates that the site was utilized throughout the fall and winter, possibly extending into the spring (Ramsay 1991). Projectile points recovered from the Melhagen site include Besant dart points and Samantha arrow points. A discriminant function analysis of the Besant points identified different functional styles relating to hafting onto arrow, dart, and spear shafts, not possible cultural sub-phases (Ramsay 1991). Six radiocarbon dates were obtained from the bison remains recovered at the Melhagen site and range from 1960 ± 90 years BP to 810 ± 205 years BP (see Appendix C).

The Fitzgerald site also represents a bison pound and processing area located within a sandhill environment which dates to the Besant phase (Hjermstad 1996). Excavation of the site revealed the remains of at least 49 bison indicating two separate kill events during the fall season; one kill event targeted a cow / calf herd while the second event targeted a bull herd. Excavation within the kill area identified "a series of post holes and bone uprights [which] have been interpreted as the remains of a corral structure" (Hjermstad 1996:26). The processing area revealed a boiling pit and bone uprights which may represent drying racks, tipi post supports, or tie-downs for dogs. The lithic assemblage is dominated by Knife River flint with 90% of the tools and debitage from the site manufactured of the exotic material. Grease for the production of pemmican appears to be the purpose of the heavy processing evident at the Fitzgerald site (Hjermstad 1996). The projectile point assemblage shows a considerable variation in body length and basal morphology which may relate to function rather than cultural sub-phases as the site represents a single occupation during the Besant phase. A total of three pottery sherds were recovered during excavation but the fragments are too small to identify as to style or manufacturing technique (Hjermstad 1996). Radiocarbon dates from the Fitzgerald site range from 1490 ± 90 years BP to 1160 ± 170 years BP (see Appendix C).

A recent compilation of 31 radiocarbon dates from Besant archaeological sites across Saskatchewan range from 3105 ± 250 years BP to 890 ± 205 years BP (Morlan 2005). Accelerator mass spectrometry (AMS) samples from sites EgNn 9 and EgNo 23 failed to provide additional data as the samples proved contaminated. A review of site forms submitted to the Heritage Resources Unit of Saskatchewan

Culture, Youth, and Recreation has identified Besant phase find locales from across the province (Figure 8.2).

8.3.2 Besant Sites in Alberta

Review of the archaeological database of site forms submitted to the Hertiage Resource Management Branch of Alberta Community Development indicates the presence of Besant projectile points at a wide array of sites including isolated finds, artifact scatters, stone feature sites, killsites, and single component and multicomponent campsites. The Canadian Archaeological Radiocarbon Database currently includes 46 radiocarbon dates from Besant sites across Alberta ranging from 3000 ± 80 years BP to 510 ± 80 years BP (Morlan 2005).

Archaeological investigation prior to construction of the Oldman River Dam in southern Alberta resulted in the identification of Besant phase campsites within the reservoir area. Besant phase occupations were identified at sites DjPl 13 and DjPm 36 located on the Oldman River, sites DjPm 44 and DjPm 228 on the Castle River, and site DjPm 100 on the Crowsnest River (Van Dyke et al 1991). Excavation at Saakhomaapina, the Boy Chief site, located near the city of Brooks in central Alberta resulted in the identification of a possible mixed Pelican Lake / Besant occupation of the region (Head et al 2003). One of the upper-most occupations identified in Block 3 contained a possible Besant flake point in association with a Pelican Lake projectile point. A mixed Pelican Lake / Besant occupation was also identified during excavation of basin four at site ElPa 1, the Scapa site, in central Alberta (Hanna and Neal 1992). Occupation six contained two Pelican Lake projectile points and two Besant points. Excavation within the Rocky Mountains near Jasper resulted in the identification of a Besant occupation within a multicomponent campsite (Kulle and Neal 1998a). A highly reworked projectile point exhibiting shallow side notches and a slightly concave base was recovered during excavation of site FfQh 31 and was classified as a Besant point (Kulle and Neal 1998a). Archaeological investigation of the Crowsnest Pass within the Rocky Mountains of southern Alberta resulted in the identification of Besant occupations within multicomponent sites (Duke 1978). Besant projectile points were recovered at site DjPo 46 (a campsite), site DjPo 9 (a killsite and campsite), and site DjPo 107 (a lithic workshop and campsite).

A buried stone circle site dating to the Besant phase was excavated prior to construction of the Oldman River Dam; site DjPm 198, located on the Oldman River (Van Dyke et al 1991). The Bow Bottom site, site EfPm 104, located within Calgary city limits also revealed buried stone circles dating to the Besant phase. Ring 6 contained a single arrow-sized Besant projectile point, Ring 12 contained a dart-sized Besant point, and Ring 9 produced two Besant flake points, three dart-sized Pelican Lake points, an arrow-sized Pelican Lake point, and two indeterminate flake points (Van Dyke 1982). Ring 12 at the Bow Bottom site produced a radiocarbon date of 2530 ± 120 years BP (Van Dyke 1982).

The Muhlbach site in central Alberta represents a single component Besant bison kill and processing site (Gruhn 1971). Excavation revealed the remains of at least 100 bison within a single layer of densely concentrated faunal specimens exhibiting a maximum thickness of 30 centimeters. A series of bone uprights consisting of a number of faunal elements within each feature were identified but the function of these uprights could not be determined. The faunal elements were too tightly packed to be supports of posts relating to the construction of a structure. A total of 61 Besant projectile points were recovered and the assemblage displays the full range of body lengths and basal morphologies seen at other Besant phase sites (Gruhn 1971). Radiocarbon dating of the bone bed at the Muhlbach site produced a date of 680 ± 150 years BP (Gruhn 1971). Excavation at the Smyth site also revealed Besant projectile points in association with a bison kill dominated by Pelican Lake points (Landals 1991). Block M, located on the edge of the primary kill area, contained a possible Besant projectile point, however, the tool was too poorly finished to confidently assign to a cultural phase. Radiocarbon dating of Block M produced a date of 2630 ± 120 years BP (Landals 1991). Projectile points that may represent reworked Pelican Lake points or, poorly finished Besant points, were also collected from Block H and E (Landals 1991).

8.3.3 Besant Sites in Other Areas of the Northern Plains

Besant occupations have been identified at archaeological sites across the northern United States, and from sites within Manitoba and British Columbia. The Canadian Archaeological Radiocarbon Database lists seven dates from Besant sites

within Wyoming range from 2120 ± 90 years BP to 1660 ± 90 years BP while the 22 dates from Montana range from 2225 ± 125 years BP to 750 ± 200 years BP (Morlan 2005). Currently the CARD website lists seven radiocarbon dates from South Dakota ranging from 1850 ± 90 years BP to 650 ± 200 years BP while the 34 Besant dates from North Dakota range from 2200 ± 125 years BP to 850 ± 70 years BP (Morlan 2005). Reeves (1983) suggests that the Besant phase does not appear across the entire northern Great Plains region (unlike the Pelican Lake phase which precedes it) and that the Besant phase :

> appears to be absent from the Big Horn-Shoshone and Platte basins of Wyoming, and from the Plains areas of Colorado, Nebraska, Kansas, and southern South Dakota. However, a few Besant points do appear in phases in these areas (Reeves 1983:93).

The Ruby site (site 48CA302) located in northern Wyoming represents a bison pound utilized throughout the Besant phase (Frison 1971). The recovery of Besant projectile points provides a relative date for the bison pound while a radiocarbon date of 1670 ± 135 years BP provides an absolute date for one of the occupations identified at the site (Frison 1971). Dart and arrow-sized Pelican Lake projectile points were also recovered during excavation of the kill site, and with the older lanceolate side notched points collected from the kill deposits, indicate that the site was used repeated (Frison 1971). The Ruby site also revealed the remains of a structure interpreted as being a ceremonial structure constructed in association with the bison pound. An oval-shaped structure indicated by post holes and badly decomposed logs was identified approximately twenty feet to the east of the pound location. The lack of artifacts and features generally associated with habitation structures and the presence of eight bison skulls lacking mandibles suggests that the structure served a ceremonial purpose relating to bison pound activities (Frison 1971). Besant projectile points were also recovered at the Kobold site in northern Wyoming (Frison 1970) while the Naze site in North Dakota produced a possible early form of Besant projectile point (Gregg 1990).

The Butler-Rissler site in central Wyoming represents a single component campsite from which debitage, firebroken rock, and non-bison faunal remains were recovered in association with Besant projectile points and cord-marked pottery (Miller et al 1987). The authors note the recovery of Plains Woodland pottery in association

with dart-sized Besant projectile points which suggests that pottery arrived on the Great Plains before the appearance of the bow and arrow (Miller et al 1987). Greiser (1994) has suggested that the Besant phase co-exists with the Keaster II phase within the Northwestern Plains of the United States. She suggests that Besant dart points are recovered from eastern portions of Wyoming and Montana while corner notched points associated with Keaster II are recovered from the western mountain region of Wyoming and Montana. Greiser (1994) suggests that Keaster II represents cultural continuity through the Pelican Lake phase. Keaster II points represent arrow-sized Pelican Lake points which co-exist with Besant dart points while Samantha points represent arrow-sized Besant points which co-exist with Avonlea arrow points (Greiser 1994).

The Canadian Archaeological Radiocarbon Database currently includes seven radiocarbon dates from Besant sites in the province of Manitoba which range from 1700 ± 100 years BP to 1310 ± 100 years BP (Morlan 2005). The only radiocarbon dates for the Besant phase in British Columbia currently consist of two dates, 1630 ± 100 years BP and 1530 ± 70 years BP, obtained from a single site in the northern boreal forest region of the province (Morlan 2005).

During the time period associated with the Besant phase the archaeological record on the Northern Plains begins to include pottery as an increasingly important element of precontact artifact assemblages. Ceramic style becomes a cultural trait used to define archaeological cultures and sub-phases, and provides evidence of contact between groups adapted to different environmental regions. As Cloutier (2004) notes :

> Ceramics are highly malleable and would therefore be likely to show evidence of contact between cultures in the form of the incorporation of foreign stylistic or manufacturing techniques into the local pottery style. (Cloutier 2004:11)

A recent review of Besant phase pottery recovered from archaeological sites across Alberta, Saskatchewan, and Manitoba concludes that very few ceramic-bearing sites have currently been identified within the region (Walde and Meyer 2003). The authors assign the Besant phase to the Late Middle Precontact Period and note the similarity of Besant pottery to the Plains Woodland tradition of conical shaped, cord-marked

pottery. Besant pottery was manufactured utilizing a cord-wrapped paddle on the exterior and an anvil on the inside of vessel. Besant pots display a simple profile with no discernible neck or shoulder while decoration, though not common, is confined to lip and rim sections. Decoration includes punctates and bosses along the rim, and the lip may show plain or cord-wrapped tool impressions. The authors note that the majority of Besant pottery from the Northwest Plains has been recovered from Sonota burial mounds in North and South Dakota and that

> the pottery becomes less and less frequent as one moves north and west of the Middle Missouri area. This pattern very much resembles a down-the-line trading fall-off curve. (Walde and Meyer 2003:139)

The authors further suggest that it "may well be that the pots found in northern Besant assemblages are, in fact, exchange goods from the southeast and not an integral part of plains Besant technology" (Walde and Meyer 2003:139). Some researchers (ie Dyck 1997[1983]) have suggested that the Besant phase must be classified as a Late Precontact Period culture based on the presence of pottery. If Besant ceramics represent a trade good then the phase may represent a Middle Precontact period Plains culture which established trade relationships with the adjacent Woodlands region rather than a Late Precontact period culture which had adopted ceramic technology.

8.3.4 Besant Variants and Associated Complexes

The Besant phase on the Northern Plains reflects a continuation of cultural assemblages and adaptive strategies from previous archaeological cultures, with the addition of ceramics to assemblages across most of the region. This continuation of existing cultural traits has been linked to the diversity seen within Besant assemblages across the Northern Plains. This continuity of traits may also explain why some researchers place the Besant phase within the Middle Precontact period while others classify the phase as a Late Precontact period culture, and why Besant assemblages are frequently included in cultural chronologies from the adjacent Woodlands cultural region.

For example, Gregg (1994) suggests that Besant assemblages be assigned to the Late Middle Woodland period, and notes that the period is marked by a number of archaeological complexes named for distinctive ceramic styles and projectile point

styles. Archaeological complexes associated with the southern extent of the Northeastern Plains (Nebraska, Iowa, and southern Minnesota) include the Boyer, Arthur, Lake Benton, and Fox Lake complexes while assemblages from the eastern portion (eastern Minnesota) are classified as belonging to the St. Croix complex. Gregg (1994) assigns archaeological assemblages from the central portion of the Northeastern Plains (North and South Dakota) to the Sonota complex while those from the western portion (Saskatchewan and northern North Dakota) are assigned to the Besant and Avonlea complexes. Gregg (1994) classifies archaeological assemblages from the northeastern portion of the Northeastern Plains (Manitoba and northern Minnesota) as belonging to the Laurel complex. This reflects an expansion on to the plains by some Laurel groups. Yet, while Gregg (1994) identifies these multiple complexes from across the Northeastern Plains, he concludes that Besant and Sonota should be considered collectively and viewed as a cultural entity extending throughout Saskatchewan, Manitoba, and North Dakota. The Besant-Sonota complex is characterized by the presence of Besant dart points, Samantha arrow points, conoidal pots, and burial mounds, and while he notes that ceramics and burial mounds are important to the cultural assemblage, they are features which are not seen throughout the region (Gregg 1994). He further notes that :

> If all of these complexes were contemporary and represent ethnic and social diversity, then the maintenance of group territories was likely a continual problem. Mounds may have served as territorial markers in addition to cemeteries (Gregg1994:74)

Other researchers have also suggested that the time period be called the Besant-Sonota phase. Gregg et al (1996) indicate that the phase should be assigned to the Middle Woodland period of the Plains Woodland Tradition and suggest that the projectile points recovered throughout the region and time period be labeled as 'Besant' while the ceramics and burial mounds should be classified as 'Sonota' cultural traits. The authors allude to the mixing of traits through succeeding cultural periods when they note that "Sonota-Besant point types include Besant Side Notched, Samantha Side Notched, and large, corner-notched forms identified as Pelican Lake and Archaic Barbed" (Gregg et al 1996:84). Hannus (1994) suggests that Besant represents a Plains Archaic tradition which extends through from the Oxbow, McKean, Duncan-Hanna, Yonkee, Pelican Lake, and Sandy Creek complexes while Sonota represents an Eastern Woodland complex which extends into Alberta, Saskatchewan,

Manitoba, and central North and South Dakota. Hannus (1994) is unsure of the relationship between Besant and Sonota and suggests that they may represent separate cultural manifestations or may simply reflect sub-phases of the same time period. Vickers (1986) suggests that the Sonota complex represents a regional sub-phase of the Besant phase and is characterized by the construction of burial mounds. An Eastern Woodland origin for the Besant phase has been suggested by Winham and Lueck who identify the Besant culture as the "most widespread of the Woodland groups" (1994:152). The Besant phase exhibits sophisticated bison procurement strategies and burial mounds, and is assigned to the Plains Woodland Period of the Middle Missouri region (Winham and Lueck 1994). The authors note that the beginning of the Plains Woodland Period is marked by the appearance of several cultural groups with subsistence based on hunting, gathering, and limited horticulture whose cultural assemblages include corner notched projectile points and elongate pottery vessels (Winham and Lueck 1994).

Variation within the Besant phase as reflected by projectile point styles is less complex. Based on the analysis of assemblages recovered at the Sjovold site, Dyck and Morlan (1995) identify three point styles associated with the Besant phase. Concave-based projectile points are labeled Sandy Creek, convex-based points are named Bratton, and while the authors do not assign a specific name to straight-based Besant points, they do describe Outlook Side-notched points as an early, straight-based Besant point (Dyck and Morlan 1995). Besant projectile points do exhibit differences in blade length, notch width, basal edge height, and shape of base but these differences are believed to reflect functional variation rather than cultural variation (Hjermstad 1996, Ramsay 1991). Smaller, slightly narrower arrow points have been recovered from Besant occupations and are interpreted as a distinct projectile point style associated with the Besant phase. Samantha projectile points are described as "straight-based, side-notched and nearly straight-sided...notches are shaped like rounded 'V's" (Dyck and Morlan 1995:229). The notches on Samantha projectile points are located low on the form, as with Besant, however the notches are not as broad and shallow as on 'typical' Besant points. Reeves (1983) and Vickers (1986) classify Samantha projectile points as the arrow point style associated with the Besant phase. Samantha projectile points and a radiocarbon date of 2290 ± 120 years BP were recovered from ring 4 at the Bow Bottom site (Van Dyke 1982). Layer

VII of the Sjovold site produced a Samantha projectile point and a radiocarbon date of 1630 ± 200 years BP (Dyck and Morlan 1995).

8.4 Discussion and Summary

Archaeological classification systems have been developed in an attempt to explain past human lifeways through the analysis of cultural remains. Taxonomic systems and culture chronologies have been developed to place artifact assemblages into specific temporal and/or spatial frameworks, and these archaeological cultures are believed to reflect the temporal and/or spatial distribution of past human populations. As radiometric dating techniques advance and as data from a wider array of archaeological sites is compiled, a clearer understanding of the Great Plains culture chronology emerges. For example, the utilization of a wide array of food sources (both plant and animal) from archaeological sites dating to the Early Precontact period refutes the previously held contention that the time period encompasses archaeological cultures adapted exclusively to big game hunting. Likewise, the recovery of ceramics from archaeological assemblages which have been classified as Middle Precontact period cultures (ie the Besant phase) requires either a redefinition of the Middle Precontact period or the clarification of the Besant phase as a Late Precontact period culture (Yellowhorn 2003). The recovery of arrow-sized projectile points from Middle Precontact period components also serves to blur the separation of the Middle and Late periods of Plains prehistory.

Projectile points are frequently used as 'index fossils' to identify archaeological cultures. Projectile points are durable and are recovered from all types of archaeological sites, from habitation locales to specialized activity areas (such as killsites, ceremonial sites, or quarries). The Pelican Lake phase has been identified by the presence of distinctive barbed, corner notched projectile points while the Besant phase is identified by the recovery of side notched projectile points showing broad, shallow notches located near the base of the form. The Pelican Lake phase and the Besant phase represent a unique juncture in Great Plains prehistory as both phases have revealed evidence of the introduction of a new technology, namely the addition of the bow and arrow to the arsenal of precontact populations. Both phases contain projectile points which correspond to atlatl dart points and smaller arrow points. Radiometric dating indicates an overlapping of the archaeological cultures

and, therefore, the Pelican Lake phase and the Besant phase may represent two distinct cultural traditions adapting to the introduction of a new technology.

Cloutier (2004) summarizes the conditions which might exist if archaeological cultures overlap and exist within a similar geographic range during the same temporal period. In regard to the Besant and Avonlea phases, Cloutier (2004) suggests that if the cultures did co-exist then the phases would exhibit overlapping radiometric dates, archaeological sites would reveal Avonlea components beneath Besant components (not just above Besant components), and interaction between the two cultures would be seen in the artifact assemblages left behind (in the form of diffusion of traits or the appearance of traits characteristic of one culture seen in the assemblage of the other). Detailed analysis of the Besant and Avonlea phases has led Cloutier (2004) to state that the two archaeological cultures occupied the northern Plains during different time periods. Besant and Avonlea occupations are frequently recovered from sites showing little stratigraphic separation between occupations and radiometric dating places the phases in close temporal association. However, evidence of cultural interaction between the Besant and Avonlea cultures is not indicated within the artifact assemblages associated with the phases and "the evidence seems to indicate that each complex had its own trading network and marriage universe that did not overlap or interact with the other" (Cloutier 2004:148). Cultural interaction between Besant populations of the Plains and contemporaneous Woodland groups is indicated by the presence of burial mounds and trade goods associated with the Sonota sub-phase of Besant. The Avonlea phase exhibits a different pattern of cultural interaction, with the recovery of River House complex artifacts indicating contact between Avonlea populations of the Plains and Laurel populations of the adjacent Woodland region (Cloutier 2004).

The question of the co-existence of cultural groups associated with the three projectile point styles which comprise the McKean Series of the Middle Precontact period has also been raised. A critical review of archaeological data relating to the McKean Series of projectile points has identified the temporal separation of the Duncan, Hanna, and McKean projectile point styles associated with the phase (Webster 2004). McKean lanceolate projectile points appear to represent a distinct cultural entity to that associated with Duncan-Hanna points and while the

archaeological cultures appear to be related, temporal separation is indicated especially in regard to the Canadian Plains (Webster 2004). McKean lanceolate projectile points exhibit a geographic distribution similar to that of Duncan-Hanna points, and radiometric dates associated with both point styles overlap. However, co-existence of the two archaeological cultures appears to be refuted by the fact that 'pure' McKean occupations have not been identified above 'pure' Duncan-Hanna occupations (Webster 2004).

In regard to the question of whether the Pelican Lake phase and the Besant phase represent two separate archaeological cultures which overlap temporally and spatially, it is possible that the distribution of a projectile point variant may help provide the answer. Radiocarbon dates associated with the Pelican Lake phase and the Besant phase overlap and components containing both Pelican Lake and Besant points have been identified. As such, a close temporal association between the two projectile point styles is indicated. Likewise, Pelican Lake components and Besant components have been recovered from close stratigraphic association during excavation of archaeological sites across the Northern Plains. A detailed study of such sites would be necessary to determine if the mixed or closely associated components contain evidence of Pelican Lake occupations above Besant occupations. Such evidence would suggest the co-existence of separate Pelican Lake and Besant archaeological cultures.

Pelican Lake and Besant components across the Northern Plains also contain a possible third distinctive projectile point style, the Sandy Creek point. Sandy Creek projectile points have been defined as a point style associated with the Besant phase (Dyck and Morlan 1995), however, a compilation of six radiocarbon dates recovered from archaeological component classified as Sandy Creek range from 3060 ± 105 years BP to 2400 ± 173 years BP (Morlan 2005). These radiocarbon dates place the Sandy Creek projectile point style within the range assigned to the Pelican Lake phase. A Sandy Creek projectile point was recovered from a component below the Pelican Lake occupation in Block 1 at site EgNn 9 and from below the Pelican Lake occupation in basin four of the Scapa site (Hanna and Neal 1992). If Sandy Creek projectile points represent a sub-phase of the Besant phase then the recovery of Sandy Creek points below and above Pelican Lake components would suggest that

Pelican Lake and Besant are separate, co-existing archaeological cultures. If Sandy Creek projectile points represent a variant associated with the Pelican Lake phase then Sandy Creek points still suggest that the Pelican Lake and Besant phases represent separate and co-existing archaeological cultures. Another suggestion would be that Sandy Creek projectile points represent a distinct and separate archaeological culture which is not relate to either the Pelican Lake and Besant phases.

As Wright (1982) states to effectively use projectile points as 'index fossils' the identification of point styles "necessitates, first of all, that the investigator be familiar with the full range of variation within a large number of different types in order to be able to assign the sample correctly to its proper classification" (Wright 1982:146). Before any meaningful discussion of the origins and diffusion of projectile points styles can be undertaken, a clear understanding of which attributes and measurements are key to the identification of a point style or sub-phase must be held by all investigators. Projectile points allow the archaeologist to chart cultural patterns across time and space. However, the analyst must be aware of a number of qualifying details. Not only should the analyst know where and when a projectile point style first appears, they must also be aware of the projectile point styles present in adjacent regions before and after the phase being studied. As well, variation within projectile point configuration may be due to factors beyond cultural preference, such as the skill of the flintknapper, the quality of the lithic material use, and reconfiguration due to resharpening and repair of broken tools. Variation must be recorded and charted just as stringently as the specifics of the projectile point styles which are recognized as characteristic of an archaeological culture. We must understand exactly what we mean when we label a projectile point as a Pelican Lake or Sandy Creek or Besant point before we can clearly understand the relationship between the archaeological cultures associated with the projectile points. A consistent, detailed description of the variations exhibited by projectile points recovered from each phase must be obtained before the relationship between the cultures can be understood. The distribution of Sandy Creek projectile points may provide insight into the question of cultural contact and continuity raised regarding the Late Middle Precontact Period. Likewise, any discussion of the origins of the Pelican Lake and Besant phases hinges on a clearer understanding of the variants within each phase.

CHAPTER 9
SUMMARY AND CONCLUSIONS

Archaeological sites EgNn 9 and EgNo 23 provide valuable insight into past human adaptation to the Great Plains, and more specifically, to sandhill environments within the greater grasslands environment. Research for this thesis was instigated as a result of the construction of a natural gas pipeline. The environmental setting of sites EgNn 9 and EgNo 23 led to a discussion of sandhill environments and the precontact utilization of the diverse resources associated with these glacial landforms. Two major periods of site utilization were identified during excavation of sites EgNn 9 and EgNo 23 which led to research into the Pelican Lake and Besant phases.

9.1 Excavation Results

Collection of materials during pipeline monitoring, archaeological testing, and block excavation has determined that sites EgNn 9 and EgNo 23 represent repeated use of the site area throughout the Middle and Late Precontact periods. Diagnostic projectile points recovered include Late Plains, Avonlea, Besant, Sandy Creek, Pelican Lake, Duncan, Hanna, and McKean point styles. Cultural materials recovered from both sites indicate that a wide array of typical campsite activities were conducted on-site. All stages of tool manufacture and repair, hide processing, and the butchering and processing of food are suggested by the array of materials recovered. Bison remains comprise a large percentage of the faunal assemblage collected at both sites, but this predominance may reflect differential preservation as much as dietary preference. Most of the faunal materials recovered during excavation of sites EgNn 9 and EgNo 23 were highly fragmented and, therefore, could not provide information regarding the game species hunted or the seasonality of site use. The faunal assemblage associated with the McKean bone bed at site EgNo 23 proved extensive enough to indicate that communal bison hunting was conducted during the summer.

Cultural materials were collected from across sites EgNn 9 and EgNo 23 as near-surface deposits and from depths of as much as 100 centimeters below ground surface. Due to the depositional environment created by sandhills and the post-depositional disturbances which have occurred at both sites, it is unclear as to the number of occupations represented by the materials at sites EgNn 9 and EgNo 23. Large concentrations of materials indicate long-term utilization of the site area for camping and hunting during the precontact period. The numerous 'pockets' of materials recovered at sites EgNn 9 and EgNo 23 may relate to a series of scattered short-term campsites or to peripheral activity areas associated with long-term occupations of the region. Excavation at sites EgNn 9 and EgNo 23 also revealed evidence of the variability of sediment deposition within sandhill environments. Profiles revealed during excavation indicate no paleosol development across portions of each site while other units revealed faint discontinuous paleosols indicative of periods of sediment stability and vegetation growth. Major soil development was identified in association with the McKean Series occupations of site EgNo 23 which indicates a long period of soil stability and vegetation cover. The high water table and easy infiltration of precipitation through the sandy sediments associated with sites EgNn 9 and EgNo 23 allowed for diverse vegetation growth, yet may have contributed to the contamination of the AMS samples submitted for radiometric dating. An end-and-side scraper recovered at site EgNo 23 provides visible evidence of the differing degrees of weathering created within sandhill deposits. The refit tool displays different colours (see Figure B4-D) created by weathering even though the pieces were separated by less than one meter horizontally and 10 centimeters vertically. Bioturbation and the shifting of the sandy sediments in which the cultural materials from the sites were deposited also allowed for the migration of artifacts within the sediments, as reflected by the recovery of refit tools separated vertically by as much as 13 centimeters.

The success of archaeological monitoring at site EgNo 23 proves the value of monitoring during pipeline construction activities. Prior to pipeline activities, cultural materials were recovered from the cultivated field in which site EgNo 23 is located and the presence of an archaeological site was confirmed during assessment of the area prior to construction of both the IPL / Enbridge and Alliance pipelines. Yet it was not until topsoil stripping of the pipeline right-of-way and temporary workspace associated

with the second pipeline through the site that the McKean Series bone bed was revealed. While some disturbance to the bone bed did occur during pipeline construction, valuable evidence of communal bison hunting during the McKean Series was recovered.

9.2 Precontact Adaptation to Grassland and Sandhill Environments

Sites EgNn 9 and EgNo 23 are located within the grasslands ecosystem of the northern Great Plains cultural area. The grasslands of the Great Plains extend northward from the high plains of Texas into southern Alberta, Saskatchewan, and Manitoba. The grasslands appear as a uniform sea of grass yet the ecosystem exhibits a diversity of habitats supporting a wide array of botanical, mammalian, and avian species. Diversity within the grasslands ecosystem was created through seasonal variation, grass fires, drought, and changes in vegetation patterns due to grazing by large ungulates. Diversity is also created by the various landforms within the grasslands environment. Glaciation has resulted in the formation of major river valleys, a mosaic of wetlands, and a series of sandhills across the Northern Plains, and these landforms create anomalous environments supporting a variety of botanical, mammalian, and avian species.

Precontact populations developed a broad spectrum hunter-gatherer adaptation to the grasslands of the Great Plains following glacial retreat. Big game hunting formed a major focus of precontact adaptation to the region, however, populations also utilized the variety of other resources available within the grasslands region and associated ecosystems. Subsistence and settlement choices made by the precontact populations of the Northern Plains targeted all of the various resources within the grasslands and sandhills environments. Choices were also made to allow for the collection of prestige and exotic items, and for the aggregation of human populations to met the social and spiritual needs of the people.

Archaeological investigation has proven that the sandhill environments across the Northern Plains provided the resources necessary for successful adaptation to the region. Archaeological investigation and ethnographic information indicate that precontact populations utilized the wide array of botanical, mammalian, and avian resources available within the sandhills. Research also indicates that the topography

of the sandhills was well suited for communal bison hunting, namely through the construction of pounds, and that precontact populations repeated used the regions for such activities. Archaeological investigation has proven that sandhill environments were utilized year-round, and that the anomalous environments have been included in the seasonal round of precontact populations from the Early Precontact period through to the Historic period. Ethnographic information also indicates that the Douglas Park Sandhills represented a spiritually significant region for precontact populations. The value of the region created by the diversity of resources within the sandhills would have been accentuated by this spiritual significance.

9.3 The Pelican Lake and Besant Phases

The archaeological record of the Great Plains displays a long period of cultural stability corresponding with a generalized tool-kit adapted to the needs of the human populations. Cultural materials recovered during excavations have been used to define archaeological cultures which are believed to correspond with the temporal and spatial distribution of human populations across the Great Plains. Archaeological investigation of sites EgNn 9 and EgNo 23 revealed intact buried occupations reflecting a portion of the culture chronology defined for the Great Plains. Two major periods of site utilization were revealed at both sites and indicate occupation of the sandhills during the Pelican Lake and Besant phases. The Pelican Lake and Besant phases are well represented in the archaeological record of the Northern Plains. Pelican Lake and Besant components have been recovered from the full array of site-types represented across the Plains; from campsites and killsites to ceremonial sites and burials. Components associated with both the Pelican Lake and Besant phases have produced overlapping radiometric dates and are frequently recovered in tight stratigraphic association. Both phases also contain projectile points reflecting the introduction of a new technology, the bow and arrow.

The recovery of materials associated with the Pelican Lake and Besant phases in similar temporal and spatial distribution raises the question of whether the two assemblages reflect two separate and co-existing cultures. Much of the material assemblage of past populations were manufactured utilizing materials which do not preserve in most depositional environments. As such, the full array of past cultural expression is no longer visible in the archaeological record. Lithic artifacts have

formed a major focus of archaeological research on the Great Plains due to the durability of the materials. While the style and manufacturing techniques exhibited by most lithic tools remains relatively constant throughout the archaeological record, projectile points styles do vary through time. Projectile points serve as 'index' fossils to define the archaeological cultures of the Great Plains. Projectile points are durable, are recovered at all types of archaeological sites, and once functional criteria are met, can express cultural preference through choices in form and material type. The recovery of a Sandy Creek projectile point from below a Pelican Lake occupation at site EgNn 9 suggests that the question of the co-existence of Pelican Lake and Besant cultures may be answered through the detailed examination of projectile point variants associated with the phases. Sandy Creek projectile points have been described as a point style associated with the Besant phase (Dyck and Morlan 1995). If the point style is associated with the Besant phase then the possible Sandy Creek occupation at site EgNn 9 would indicate that a Besant occupation predates Pelican Lake occupation of the region and, therefore, that the two are separate and co-existing cultures.

9.4 Conclusions

Archaeological investigation of sites EgNn 9 and EgNo 23 have revealed that the Douglas Park Sandhills were successfully utilized throughout the Middle and Late Precontact periods. The depositional environment and post-depositional disturbances present within sandhill environments may create challenges to the interpretation of materials recovered during excavation, yet valuable information regarding precontact utilization of the region was revealed. The importance of archaeological monitoring within the sandhills was also revealed, as the region was utilized throughout the archaeological record but use is frequently represented by pockets of materials scattered across a large area. Archaeological investigation and ethnographic information indicates that sandhill environments across the Northern Plains provided a wide array of resources which were utilized by precontact populations year-round. Sandhill environments contained the resources necessary for large-scale camping and communal hunting, and for short-term use by past populations throughout the archaeological record.

The recovery of arrow-sized projectile points from sites dating to the Pelican Lake and Besant phases, and the recovery of pottery from Besant sites, demands a re-examination of the cultural sequence currently identified for the Great Plains. As well, the recovery of a Sandy Creek projectile point from an intact buried component below a clearly defined Pelican Lake occupation during excavation in association with this thesis calls for a re-examination of the relationship between the Sandy Creek and Pelican Lake phases. As our inventory of archaeological sites excavated within the Great Plains region expands and the range of cultural materials recovered increases, our understanding of the archaeological cultures of the region expands. With advances in analytical technologies such as radiometric dating, blood residue analysis on lithic tools, and residue analysis on pottery sherds, our understanding of the archaeological cultures of the Great Plains becomes broader and clearer. Close examination of radiometric dates has clarified our understanding of the McKean Series (Webster 2004) and the relationship between the Besant and Avonlea phases (Cloutier 2004). Detailed examination and recording of the variation exhibited by projectile points within the cultural phases of Plains prehistory must be undertaken to expand and clarify our understanding of the cultural sequence of the Great Plains. Examination of the diversity of projectile point styles within the archaeological record, combined with an understanding of the regional variants and projectile point series found within adjacent cultural regions, will help us chart changes in technology through the cultural sequence of the Great Plains prehistory.

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APPENDIX A

LITHIC TOOL DESCRIPTIONS
SITE EgNn 9

Projectile Points and Point Fragments

Projectile points are specialized bifacial tools, commonly assumed to have been used for the hunting of game. Generally they are symmetric bifacially shaped and retouched forms with specialized hafting modifications. Three general classes are commonly recognized including thrusting spear points, atlatl dart points, and arrow points. Projectile points have been used as 'index fossils' to classify archaeological time periods and cultures.

Site EgNn 9

Cat.No. 1 Pelican Lake point base ; moderately finished - lateral margins well finished but rest of form only minimally finished, appears to have been reworked, broken just above shoulders, rounded and slightly tanged shoulders, broad corner notches, narrow almost stemmed base, basal corners rounded and flare outwards, slightly concave base, biconvex cross section

Material Type : grey porcellanite

Provenience : surface collection

Permit # 99-19

Figure A1-G

Cat.No. 2 possible Avonlea point base ; well finished, broken diagonally from top of one notch to just above shoulder on opposite side, rounded shoulder, small rounded side notches, one basal edge squared but opposite is rounded and flaring, slightly concave base, biconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A1-I

Cat.No. 3 possible Sandy Creek point ; well finished though asymmetric due to flaw in material, asymmetric triangular body with slightly excurvate lateral edges and rounded shoulders, side notched - one notch shallow and rounded while other is v-shaped, rounded basal edges, shallow basal notch giving slightly eared appearance, biconvex cross section

Material Type : Montana chert

Provenience : surface collection

Permit # 99-19

Figure A1-J

Cat.No. 5 Late Precontact triangular point ; well finished, asymmetric due to reworking of body and slight flaw in material near base, triangular body, lateral edges contract near base creating basal edges, concave base, asymmetric biconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A1-H

Cat.No. 7 indeterminate base fragment ; well finished, broken diagonally through one notch to just above opposite shoulder, rounded shoulder, shallow rounded side notch, rounded basal edge, convex base, biconvex cross section, too fragmentary to define but size indicates Late Precontact

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A1-D

Cat.No. 711 indeterminate base fragment ; one surface shows minimal finishing while opposite is moderately finished, one basal edge and portion of one notch present, appears to be rounded shallow side notch, rounded basal edge and slightly concave base gives eared appearance, plano-convex cross section

Material Type : Knife River flint

Provenience : surface collection

Permit # 99-19

Figure A1-M

Cat.No. 840 Besant point ; well finished, still symmetric even though reworked, tip shows impact fracture, tip and right lateral edge reworked, rounded triangular body, broad shallow notches with angle approaching corner notching, small

square basal edge on flaring base, left basal edge broken, slightly concave base, biconvex cross section

Material Type : Swan River chert

Provenience : Shovel Test # 10 20-40 cm BS

Permit # 00-31

Figure A1-B

Cat.No. 932 Pelican Lake point ; moderately finished, tip missing and showing impact fracture, asymmetric triangular body, relatively open corner notches, rounded basal edges, uneven convex base, asymmetric biconvex cross section

Material Type : brown silicified wood

Provenience : 285N 235E 60-70 cm BS
Block 1 Occupation 5

Permit # 00-31

Figure A1-F

Cat.No. 1013 indeterminate point fragment ; body and base fragment with portions of both dorsal and ventral surfaces missing due to laminar fracture from heat damage, too damaged to identify type, shape, cross section, possibly corner notched with one notch present, size suggests atlatl dart point

Material Type : heat damaged brown silicified wood

Provenience : 195N 291E 15-20 cm BS

Permit # 00-31

Figure A1-L

Cat.No. 1024 possible Besant base ; well finished, broken across midpoint of notches, possibly side notched, rounded basal edges with one edge more flared than other, straight base, biconvex cross section

Material Type : patinated brown silicified peat

Provenience : 195.82N 291.85E 34 cm BS

Permit # 00-31

Figure A1-C

Cat.No. 2467 Pelican Lake point body ; well finished though small section of ventral surface retains smooth unworked appearance of flake, broken across neck with base missing, straight lateral edges with one edge showing reworking giving slightly asymmetric appearance, barbed shoulders, broken through notches but appears to have had fairly open corner notches, flat biconvex cross section

Material Type : Knife River flint

Provenience : Block 1 284.46N 234.82E Level 7 85 cm BD, # 9 on map
Block 1 Occupation 5

Permit # 01-45

Figure A1-E

Cat.No. 2468 possible Sandy Creek or Oxbow point ; moderately finished, tip missing, reworking has created alternate edge beveling, one surface shows impact fracture that removed tip, lateral edges appear to have been slightly excurvate, rounded shoulders, shallow side notches, rounded tanged basal edges, concave base, biconvex cross section

Material Type : mottled brown chalcedony

Provenience : Block 1 284N 234E Level 8
Block 1 Occupation 6

Permit # 01-45

Figure A1-K

Cat.No. 2469 and 2476 refit Besant point ; moderately finished, reworked, extreme tip missing due to impact fracture, tip and distal end of point broken during attempt to rework tool, blade asymmetric due to resharpening, elongate blade with excurvate edges, broad shallow side notches, rounded shoulders, rounded basal edges, straight base, biconvex cross section, tip fragment thinner than body as material lost when tool broken

Material Type : heat treated brown silicified wood

Provenience : base (#2469) Block 1 286.13N 237.27E Level 6 80 cm BD
tip (#2476) Block 1 286.41N 236.71E Level 5 67 cm BD
Block 1 Occupation 4

Permit # 01-45

Figure A1-A

Cat.No.	A (mm)	B (mm)	AB (mm)	C (mm)	D (mm)	F (mm)	E/G (mm)	H (mm)	I (mm)	J (mm)	K/L (mm)	N (mm)	O (mm)	M (gm)
1		8.70	14.25*		17.63	9.36	13.28	6.45	3.57	1.14	3.71			0.9*
2		7.70	15.17			13.48	16.56	3.03	2.65	3.70	6.41*			1.7*
3	13.14	9.02	22.16	15.46	15.46	12.34	15.13	5.17	1.98	2.70	4.93	1.13	4.34	1.7
5			20.48				13.05				4.14			0.7*
7		9.38*				11.58	13.19	4.50	1.72	1.20	5.56*			0.7*
711		8.46*				14.14*				4.65	3.91*			0.4*
840	18.10	6.86	24.96	18.86	17.39	13.05		6.00	2.19	1.60	5.61			2.9
932	15.95*	7.71	23.66*	15.81	15.81	10.92	11.77	4.84	1.65		5.38			1.8*
1013			23.39*	18.80		13.11					3.9*			1.7*
1024		9.23*					21.43				4.35*			0.8*
2467	24.37			16.11		7.46*					3.11			0.9*
2468	17.03*	6.63	23.66*	17.43	17.43	13.38	14.63	4.80	1.68	2.58	5.70	2.10	3.72	2.5*
2469/2476	29.22*	7.84	37.06*	19.99	19.99	16.31	20.43	5.62	1.68	2.07	5.27			3.8*

* indicates incomplete measurement, broken tool

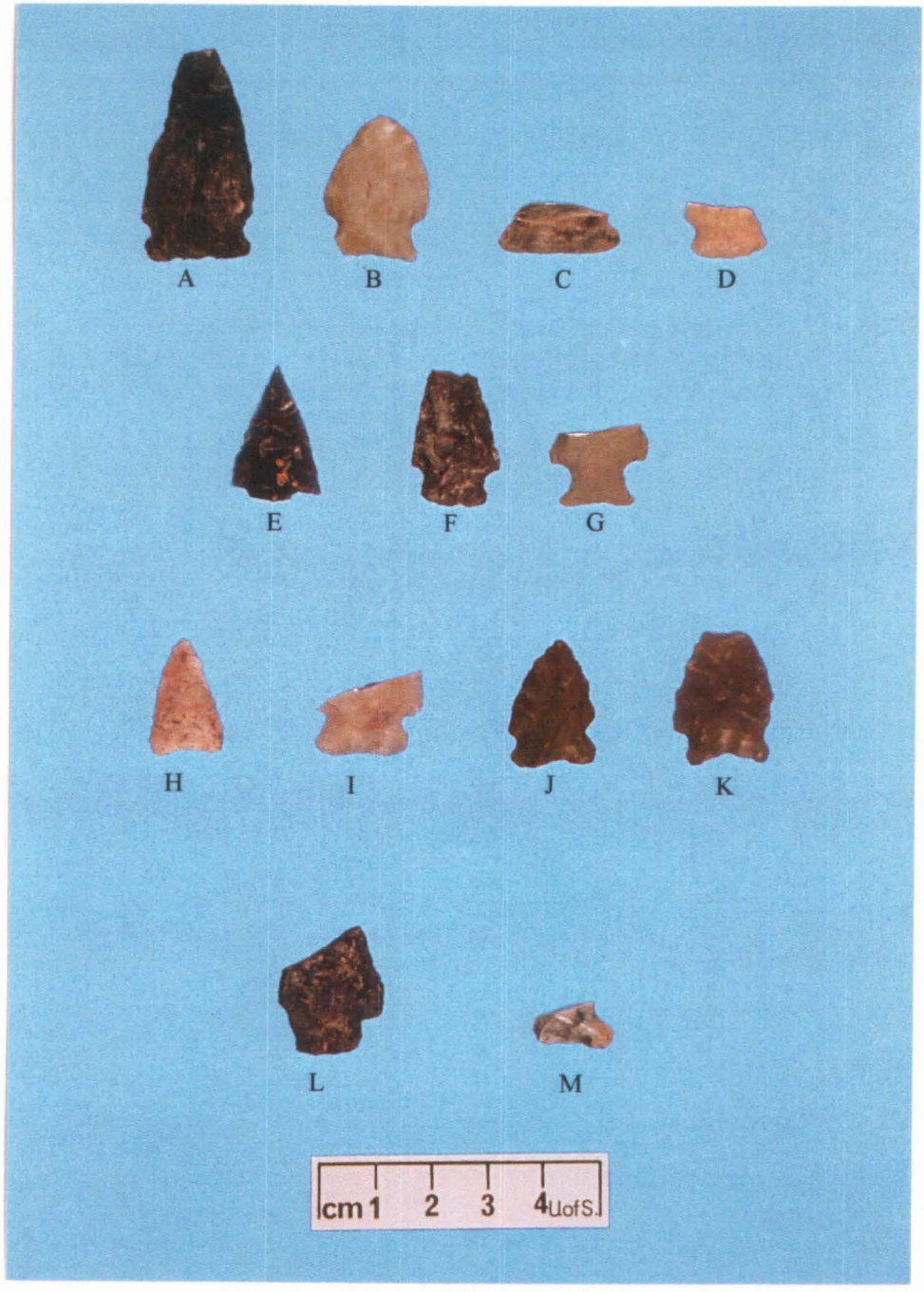


Figure A1

A - Besant point (2469/2476), B - Besant point (840), C - Besant point (1024), D - point base (7), E - Pelican Lake point (2467), F - Pelican Lake point (932), G - Pelican Lake base (1), H - Late Period triangular (5), I - Avonlea base (2), J - Sandy Creek point (3), K - Sandy Creek point (2468), L - point base (1013), M - point base (711).

Bifaces and Biface Fragments

Bifaces are characterized by the complete or near complete bifacial finishing of the tool, in addition to marginal flaking to sharpen tool edges. Functionally they are assumed to have served a number of purposes including, but not limited to cutting. Bifaces may display specialized hafting modifications.

Site EgNn 9

Cat.No. 4 biface, moderately finished with slight flaws in material on both dorsal and ventral surfaces, tear-drop shape, slightly asymmetric biconvex cross section

Material Type : heat treated Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A2-A

Cat.No. 18 biface fragment, moderately finished, one edge shows steep angle/beveled retouch, too fragmentary to identify shape or cross section

Material Type : patinated yellow chalcedony

Provenience : surface collection

Permit # 99-19

Cat.No. 857 biface fragment, lateral fragment of moderately finished tool, possibly portion of proximal end of tool

Material Type : Swan River chert

Provenience : Shovel Test # 31 20-30 cm BS

Permit # 00-31

Cat.No. 883 biface fragment, tip fragment of well finished tool, too fragmentary to determine shape, function, or cross section

Material Type : brown chalcedony

Provenience : 291N 246E 40-50 cm BS
Block 2 Occupation 5

Permit # 00-31

Cat.No. 972 biface fragment, tip and body fragment of well finished tool, probably fragment of large fragment of large biface (too large to be projectile point)

Material Type : Swan River chert

Provenience : 279N 370E 50-60 cm BS

Permit # 00-31

Cat.No. 1086 biface fragment, lateral fragment of moderately finished tool, too fragmentary to determine shape or function

Material Type : feldspathic siltstone

Provenience : 195N 251E 30-40 cm BS

Permit # 00-31

Cat.No. 2470 biface tip, extreme tip of well finished tool, too fragmentary to identify shape, function, etc.

Material Type : heat treated silicified wood

Provenience : Block 1 284N 234E Level 6

Block 1 Occupation 4

Permit # 01-45

Cat.No. 2471 biface tip, moderately finished, asymmetric, too fragmentary to identify shape, function, etc.

Material Type : Swan River chert

Provenience : Block 1 284N 234E Level 7

Block 1 Occupation 5

Permit # 01-45

Cat.No. 2472 biface tip, well finished, asymmetric, one edge is concave, too fragmentary to identify shape, function, etc.

Material Type : Knife River flint

Provenience : Block 1 284.83N 236.89E Level 6 77 cm BD

Block 1 Occupation 4

Permit # 01-45

Cat.No. 2474 biface fragment, extreme lateral margin of well finished bifacial tool, too fragmentary to identify shape, function, etc.

Material Type : patinated black chert

Provenience : Block 1 286N 234E Level 6

Block 1 Occupation 4

Permit # 01-45

Cat.No. 2519 biface tip, extreme tip of well finished tool, too fragmentary to identify shape, function, etc.

Material Type : Knife River flint

Provenience : Block 2, 291.94N 247.54E, Level 6, 74 cmBD

Permit # 01-45

Biface Measurements, Site EgNn 9

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
4	2.8	1.5	0.6	2.2
18	2.2*	1.5*	0.4*	1.1*
857	3.1*	2.1*	0.8*	5.2*
883	1.5*	1.5*	0.4*	0.6*
972	1.8*	1.7*	0.5*	1.3*
1086	1.3*	2.2*	0.6*	2.2*
2470	1.1*	1.0*	0.3*	0.3*
2471	1.3*	1.5*	0.4*	0.5*
2472	1.9*	1.8*	0.5*	1.5*
2472	1.2*	1.0*	0.4*	0.4*
2519	1.3*	1.2*	0.4*	0.4*

* indicates incomplete measurement, broken tool

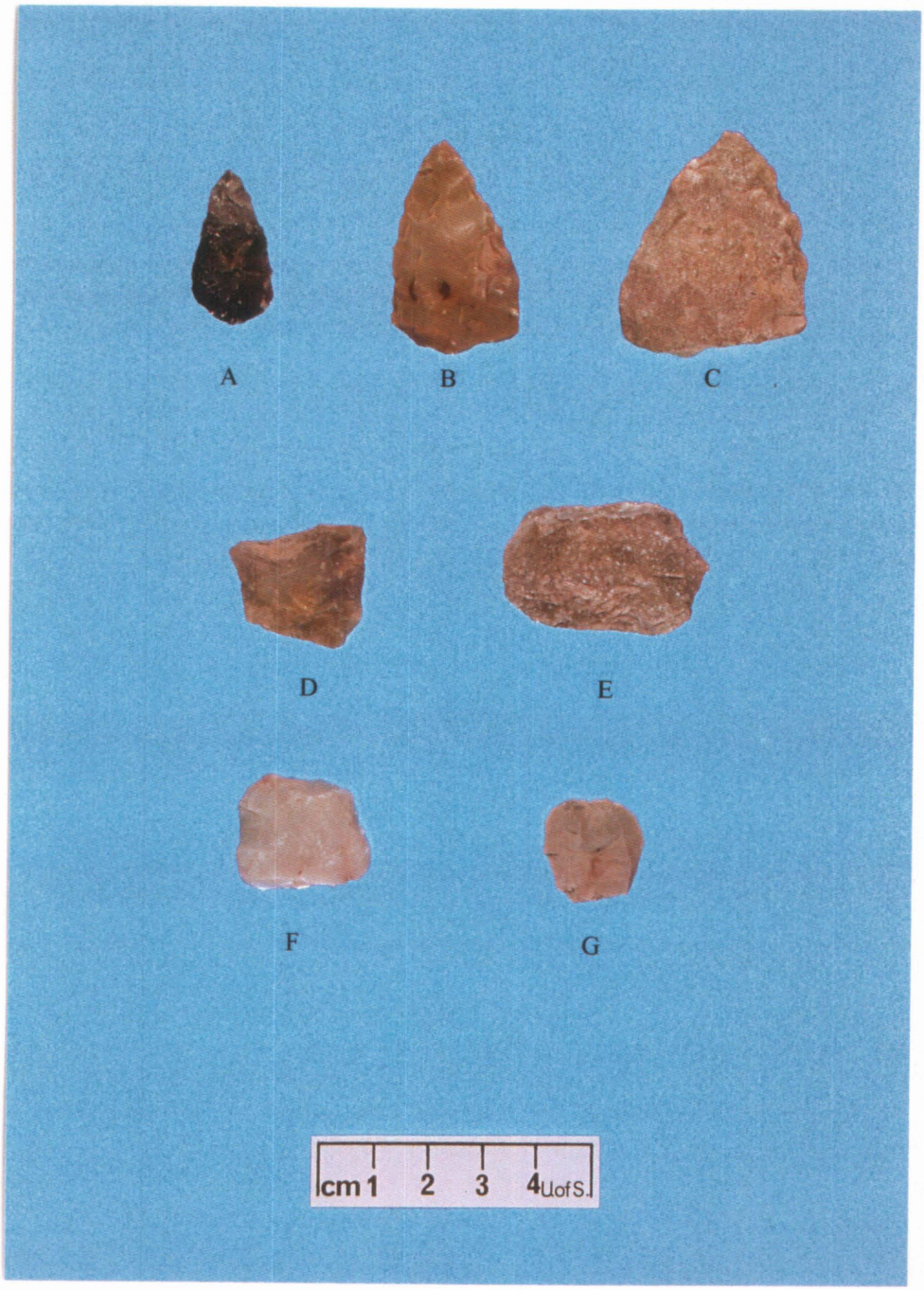


Figure A2

A - biface (4), B - preform (2473), C - preform (6), D - wedge (962), E - wedge (33), F - wedge (1110), G - wedge (26).

Preforms and Preform Fragments

Preforms are bifacial tool blanks demonstrating varying levels of bifacial thinning and shaping. Preforms range from small pieces of raw material displaying minimal finishing (stage 1) to almost completely finished forms simply lacking hafting modifications (stage 5) (Keyser 1985).

Site EgNn 9

Cat.No. 6 preform, stage 3, early stage of bifacial shaping, proximal end unworked, abandoned before completed, roughly triangular shape, asymmetric biconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A2-C

Cat.No. 34 failed preform fragment, minimal unifacial flaking around portion of flake fragment, broken during manufacture

Material Type : brown silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 66 preform fragment, stage 2, early stage bifacial shaping, broken during manufacture

Material Type : white quartz

Provenience : surface collection

Permit # 99-19

Cat.No. 69 preform fragment, stage 3, bifacial shaping across portion of tool present, broken during manufacture

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 92 preform fragment, stage 2, early stage of bifacial shaping, broken during manufacture

Material Type : brown silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 94 preform fragment, stage 3, bifacial shaping across portion of tool present, broken during manufacture

Material Type : tan silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 846 failed preform, primary decortication flake with attempted unifacial shaping along one margin

Material Type : brown silicified wood

Provenience : Shovel Test # 21 45-60 cm BS
Block 2 Occupation 5

Permit # 00-31

Cat.No. 906 failed preform, secondary flake with attempted bifacial shaping along two margins, one edge shows sinuous bifacial retouch and use, material shows numerous flaws

Material Type : brown silicified wood

Provenience : 285N 235E 50-60 cm BS
Block 1 Occupation 4

Permit # 00-31

Cat.No. 2473 preform, stage 4, well finished , bifacial flaking across most of the tool, triangular shape with unfinished convex base, potion of one edge near base unworked, biconvex cross section

Material Type : mottled tan chert

Provenience : Block 1 285.06N 236.16E level 5 70 cm BD
Block 1 Occupation 4

Permit # 01-45

Figure A2-B

Cat.No. 2475 preform fragment, stage 4, moderate bifacial finishing , possibly convex base fragment of preform, asymmetric biconvex cross section

Material Type : feldspathic siltstone

Provenience : Block 1 286.16N 234.10E Level 7 86 cm BD

Block 1 Occupation 5

Permit # 01-45

Cat.No. 2520 failed preform, bipolar decortication flake showing very early stage attempt to shape and sharpen form

Material Type : mixed yellow chert

Provenience : Block 2 289N 245E Level 1

Block 2 Occupation 1

Permit # 01-45

Cat.No. 2521 preform fragment, stage 3, early stage bifacial shaping across form

Material Type : Swan River chert

Provenience : Block 2 289N 245E Level 5

Block 2 Occupation 5

Permit # 01-45

Preform Measurements, Site EgNn 9

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
6	4.2	3.4	1.2	18.6
34	2.7*	1.8*	0.6*	4.4*
66	2.6*	1.8*	1.3*	5.8*
69	2.0*	1.3*	0.8*	2.4*
92	3.8*	3.1*	1.4*	19.1*
94	3.0*	1.7*	0.9*	3.8*
846	5.5	4.1	1.1	28.8
906	5.5	4.0	1.9	36.8
2473	3.9	2.3	0.8	6.9
2475	2.6*	3.7*	1.4*	11.7*
2520	2.5	1.6	0.8	3.0
2521	3.1*	3.9*	1.1*	14.8*

* indicates incomplete measurement, broken tool

Wedges and Wedge Fragments

Wedges are bifacially modified tools believed to have been used for splitting wood, antler, and bone. They may be highly modified forms to irregularly shaped, minimally finished tools. Diagnostic attributes include bipolar flaking, hinge fracturing, and crushing along both the proximal and distal ends due to the massive application of force. Wedges are also referred to as pieces esquillees.

Site EgNn 9

Cat.No. 26 heavy battering along proximal and distal ends, possibly exhausted bipolar core, rounded rectangular shape, proximal and distal ends shorter than lateral sides

Material Type : mottled grey chert

Provenience : surface collection

Permit # 99-19

Figure A2-G

Cat.No. 33 heavy battering along proximal and distal ends, possibly exhausted bipolar core, rectangular shape, proximal and distal ends longer than lateral sides

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A2-E

Cat.No. 142 wedge fragment, broken during use, single heavily battered end present

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 144 wedge fragment, broken during use, two heavily battered ends present indicating proximal/distal and lateral/lateral use

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 962 wedge, heavy bifacial battering showing proximal/distal and lateral/lateral use as wedge, portion of one lateral edge broken

Material Type : mottled grey chalcedony

Provenience : 280N 308E 60-70 cm BS

Permit # 00-31

Figure A2-D

Cat.No. 1110 wedge fragment, exhausted bipolar core showing proximal/distal battering indicative of use as wedge, possible lateral/lateral use

Material Type : Swan River chert

Provenience : surface collection Area 3

Permit # 00-31

Figure A2-F

Wedge Measurements, Site EgNn 9

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
26	1.9	2.0	0.6	1.9
33	2.5	3.7	1.1	10.7
142	1.9*	2.7*	0.6*	3.5*
144	2.0*	1.8*	0.6*	2.4*
962	2.5	2.2*	1.0	5.8*
1110	2.4*	2.1*	0.9*	5.6*

* indicates incomplete measurement, broken tool

Scrapers and Scraper Fragments

Scrapers are specialized unifacial tools displaying characteristic steep angle retouch along the working edge(s) of the tool. End and side scrapers exhibit retouch along the distal end of the tool plus patterned one or both lateral edges. Retouch is confined to the distal end of the tool on endscrapers while sidescrapers exhibit the working edge of the tool along the lateral edge of the form.

Site EgNn 9

Cat.No. 8 end and side scraper, steep angle unifacial retouch along distal end and both lateral edges, proximal end broken, dorsal surface retains arris, roughly rectangular in shape, slightly asymmetric triangular cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A3-G

Cat.No. 9 endscraper, steep angle retouch along distal end, unifacial retouch along portion of right lateral edge present, left edge and proximal end broken, dorsal surface retains arris, biplano cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A3-P

Cat.No. 10 end and side scraper, steep angle unifacial retouch along distal end and both lateral edges, dorsal surface retains small section of cortex, left lateral edge has been reworked, distal end shows heavy use, triangular shape, asymmetric triangular cross section

Material Type : patinated brown chalcedony

Provenience : surface collection

Permit # 99-19

Figure A3-E

Cat.No. 11 end and side scraper, steep angle unifacial retouch along distal end and right lateral edge, unifacial retouch along left edge, distal end broken then reworked to irregular shape, proximal end broken, irregular shape and cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A3-I

Cat.No. 13 endscraper, steep angle unifacial retouch along distal end, lateral edges show minimal retouch although tool has been broken near distal end, minimal shaping of dorsal surface, heavy use shown on distal end, asymmetric triangular cross section

Material Type : patinated Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A3-O

Cat.No. 14 thumbnail end and side scraper, steep angle unifacial retouch along distal end and both lateral edges, dorsal surface retains cortex, ventral surface retains bulb of percussion, rectangular shape, asymmetric biplano cross section

Material Type : patinated brown chalcedony

Provenience : surface collection

Permit # 99-19

Figure A3-B

Cat.No. 15 endscraper, steep angle unifacial retouch along distal end, no modification along lateral edges, dorsal surface retains cortex, roughly rectangular shape, asymmetric domed cross section

Material Type : brown silicified wood

Provenience : surface collection

Permit # 99-19

Figure A3-N

Cat.No. 17 end and side scraper, steep angle unifacial retouch along distal end and left lateral edge, right lateral edge broken, distal end shows heavy use, dorsal surface retains arris, irregular shape and cross section

Material Type : mixed grey chalcedony

Provenience : surface collection

Permit # 99-19

Figure A3-H

Cat.No. 19 end and side scraper, steep angle unifacial retouch along distal end and right lateral edge (both show hinge fracturing from reworking), unifacial shaping and retouch along left edge, dorsal surface completely finished, roughly triangular shape, asymmetric domed cross section

Material Type : patinated brown chert

Provenience : surface collection

Permit # 99-19

Figure A3-A

Cat. No. 20 end and side scraper, steep angle retouch along distal end and right lateral edge, left edge broken, dorsal surface retains arris, ventral surface retains bulb of percussion, distal end and right edge show heavy use, triangular shape and cross section

Material Type : patinated brown chalcedony

Provenience : surface collection

Permit # 99-19

Figure A3-F

Cat.No. 21 endscraper, steep angle unifacial retouch along distal end, dorsal surface and lateral edges show thinning and minimal shaping, slightly spurred appearance due to reworking of distal end which also shows heavy use, rectangular shape, domed cross section

Material Type : patinated brown silicified wood

Provenience : surface collection

Permit # 99-19

Figure A3-L

Cat.No. 22 sidescraper, steep angle unifacial retouch and heavy use along one lateral edge of tool, rest of tool unworked, longest axis of tool forms working edge, irregular shape and cross section

Material Type : mottled brown chert

Provenience : surface collection

Permit # 99-19

Figure A3-R

Cat.No. 30 scraper fragment, steep angle unifacial retouch along both lateral edges, dorsal and ventral surfaces retain flake landmarks, possibly proximal end of end and side scraper

Material Type : patinated brown chert

Provenience :surface collection

Permit # 99-19

Cat.No. 37 reverse scraper, well patterned low angle unifacial retouch and battering along distal end of cobble spall, moderately patterned unifacial retouch and battering along left lateral edge

Material Type : mixed yellow quartzite

Provenience : surface collection

Permit # 99-19

Figure A4-E

Cat.No. 160 end and side scraper, steep angle unifacial retouch along distal end and left lateral edge, steep angle retouch along extreme distal section of right edge, dorsal and ventral surfaces retain flake landmarks, asymmetric rectangular shape, asymmetric triangular cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure A3-D

Cat.No. 203 endscraper, steep angle unifacial retouch along distal end, rest of tool is unfinished, irregular shape and cross section

Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19
Figure A3-Q

Cat.No. 935 end and side scraper, unusual tool, possibly utilized preform, steep angle unifacial retouch along all margins of tool, dorsal surface retains appearance of core (not flake), ventral surface completely flat, rounded rectangular shape, planoconvex cross section
Material Type : yellow quartzite
Provenience : 280N 308E 40-50 cm BS
Permit # 00-31
Figure A4-C

Cat.No. 957 scraper fragment, steep angle unifacial retouch along distal end, rest of tool missing so no indication of shape, cross section or addition modification
Material Type : Swan River chert
Provenience : 280N 308E 50-60 cm BS
Permit # 00-31

Cat.No. 1099 endscraper, steep angle unifacial retouch along distal end, minimal retouch along both lateral edges, roughly rectangular shape, triangular cross section
Material Type : Swan River chert
Provenience : surface collection Area 3
Permit # 00-31
Figure A3-M

Cat.No. 1107 end and side scraper, steep angle unifacial retouch along distal end and right lateral edge, left edge broken, dorsal surface appears unmodified giving asymmetric cross section, possible rectangular shape
Material Type : Swan River chert
Provenience : surface collection Area 3
Permit # 00-31

Figure A3-J

Cat.No. 2478 scraper fragment, steep angle unifacial retouch along one edge, unifacial retouch along opposite edge, proximal end of scraper

Material Type : patinated brown chert

Provenience : Block 1 284.26N 236.50E Level 6 74 cm BD

Block 1 Occupation 4

Permit # 01-45

Cat.No. 2522 endscraper, well finished steep angle unifacial retouch along distal end, minimal crushing of proximal end and edges from hafting, triangular shape, asymmetric planoconvex cross section

Material Type : mixed yellow chert

Provenience : Block 2 288.84N 245.70E Level 4 56 cm BD

Block 2 Occupation 4

Permit # 01-45

Figure A3-K

Cat.No. 2523 end and side scraper, moderately finished steep angle unifacial retouch along distal end and convex left edge, moderately patterned unifacial retouch along right edge, rectangular shape, asymmetric planoconvex cross section, notch on right edge

Material Type : feldspathic siltstone

Provenience : Block 2 289.40N 248.63E Level 3 44 cm BD

Block 2 Occupation 3

Permit # 01-45

Figure A4-A

Cat.No. 2524 scraper fragment, well finished steep angle unifacial retouch along distal end, broken near distal end so unable to determine modification of edge and base, shape, etc.

Material Type : mixed white chert

Provenience : Block 2 289.04N 248.07E Level 4 55 cm BD

Block 2 Occupation 4

Permit # 01-45

Cat.No. 2525 scraper fragment, moderately finished steep angle retouch along distal end and right edge, left lateral edge broken, possibly rectangular shape, biplano cross section

Material Type : Swan River chert

Provenience : Block 2 289.41N 248.33E Level 4 53 cm BD
Block 2 Occupation 4

Permit # 01-45

Cat.No. 2526 end and side scraper, well finished steep angle retouch along distal end and right edge, proximal end unfinished, asymmetric rectangular shape, asymmetric planoconvex cross section

Material Type : Swan River chert

Provenience : Block 2 289.82N 248.91E Level 4 58 cm BD
Block 2 Occupation 4

Permit # 01-45

Figure A3-C

Cat.No. 2527 end and side scraper, moderately patterned steep angle unifacial retouch along distal end and right edge, moderate unifacial retouch along left edge, rounded rectangular shape, asymmetric planoconvex cross section

Material Type : Swan River chert

Provenience : Block 2 291.65N 247.37E Level 5 66 cm BD
Block 2 Occupation 5

Permit # 01-45

Figure A4-B

Scraper Measurements, Site EgNn 9

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
8	2.3*	2.1	0.8	4.1*
9	1.5*	1.8*	0.4	1.2*
10	2.0	1.3	0.7	1.4
11	2.9*	2.1	0.9	4.7*
13	1.6*	2.1	0.5	1.9*
14	1.6	1.2	0.4	0.9
15	2.2	1.8	0.7	2.7
17	2.8	2.1*	0.4	3.2*
19	1.8	1.5	0.5	1.5
20	1.9	1.6*	0.6	1.8*
21	1.7	1.6	0.6	1.9
22	2.9	1.5	0.7	2.8
30	2.0*	1.7*	0.4*	1.9*
37	7.5	6.3	2.0	123.5
160	2.3	1.1	0.6	1.7
203	3.1	1.7	1.2	4.8
935	5.4	3.3	3.0	70.0
957	0.8*	1.8*	0.5*	0.7*
1099	1.9	1.8	0.7	2.4
1107	2.2	1.9*	1.1	4.9*
2478	1.6*	1.7*	0.4*	0.9*
2522	1.7	1.4	0.5	1.1
2523	5.0	3.0	1.3	20.7
2524	1.3*	2.2*	0.5*	1.8*
2525	2.2	1.9*	0.4	1.7*
2526	1.6	1.7	0.5	1.6
2527	4.1	3.3	1.2	20.1

* indicates incomplete measurement, broken tool

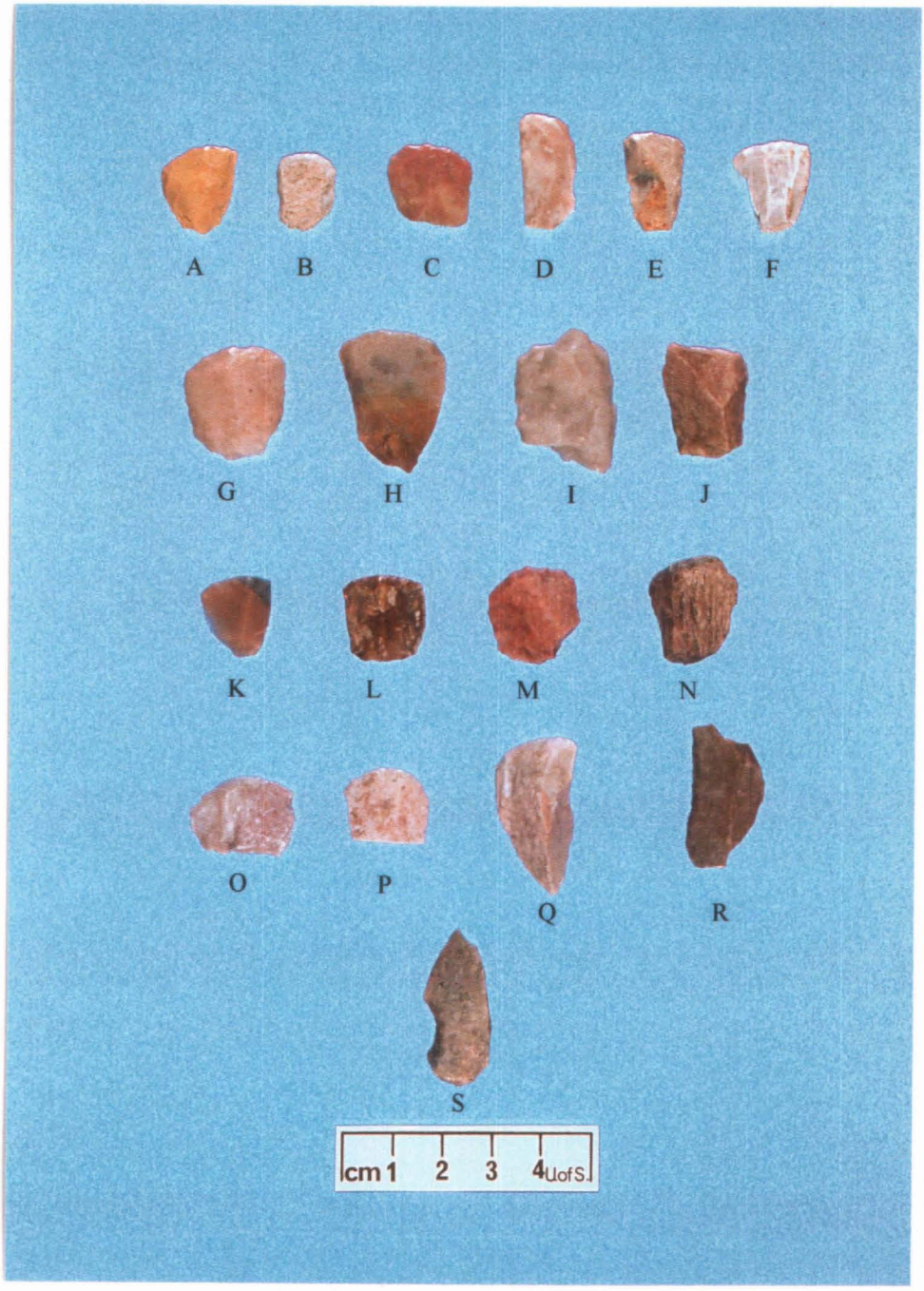


Figure A3

A - end/side scraper (19), B - end/side scraper (14), C - end/side scraper (2526), D - end/side scraper (160), E - end/side scraper (10), F - end/side scraper (20), G - end/side scraper (8), H - end/side scraper (17), I - end/side scraper (11), J - end/side scraper (1107), K - endscraper (2522), L - endscraper (21), M - endscraper (1099), N - endscraper (15), O - endscraper (13), P - endscraper (9), Q - endscraper (203), R - sidescraper (22), S - spokeshave.

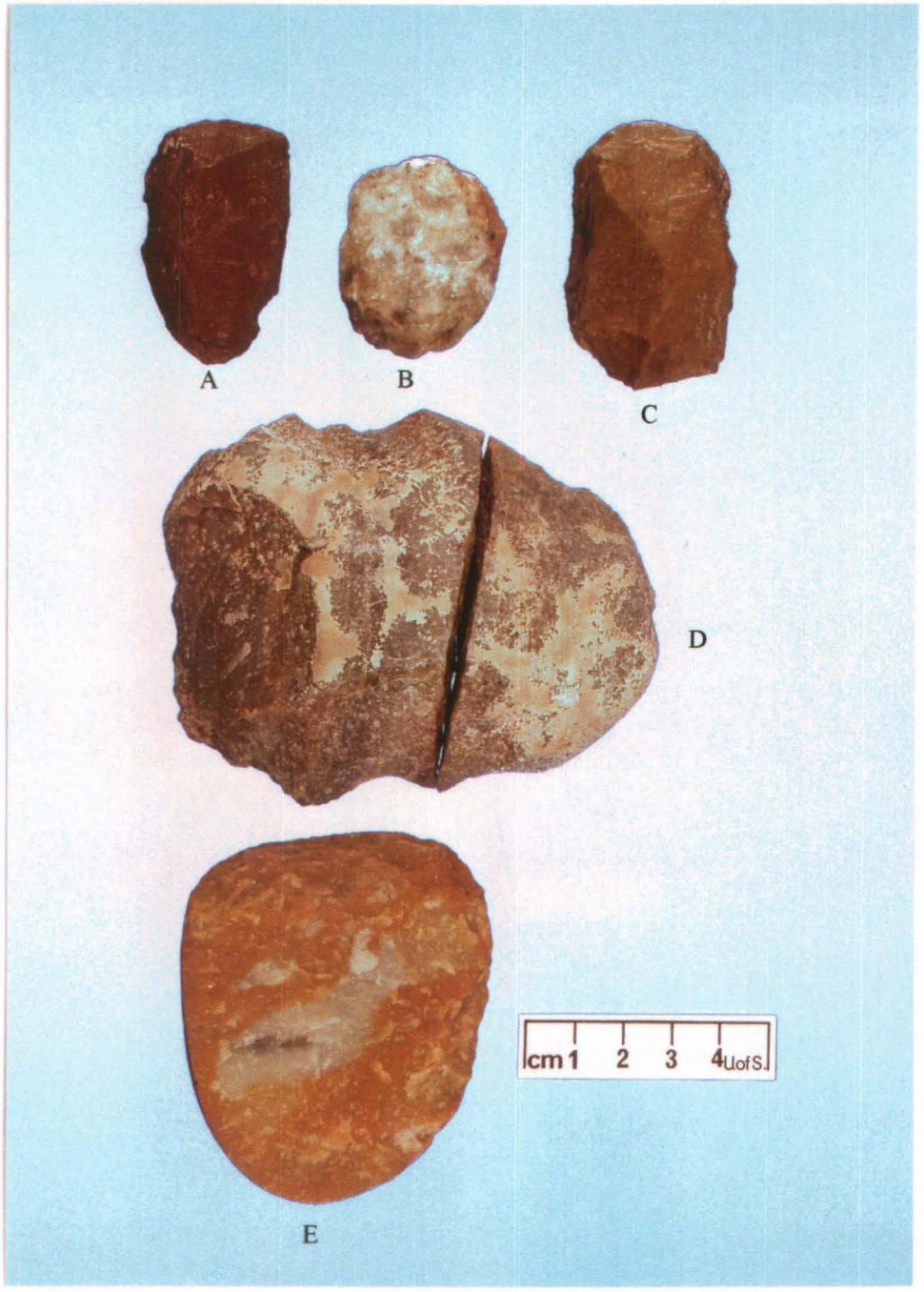


Figure A4

A - end/side scraper (2523), B - end/side scraper (2527), C - end/side scraper (935), D - refit retouched cobble spall (2545/2552), E - reverse scraper (37).

Spokeshaves

Spokeshaves are tools on which the concave working surface is purposefully formed through patterned retouch and sharpening.

Site EgNn 9

Cat.No. 2477 spokeshave, moderately patterned unifacial retouch and battering along concave section of flake fragment

Material Type : mixed grey quartzite

Measurements : length - 3.2 cm, width - 1.5 cm, width - 0.7 cm, weight - 2.9 gm

Provenience : Block 1 284.57N 234.30E Level 10 120 cm BD

Block 1 Occupation 8

Permit # 01-45

Figure A3-S

Hammerstones

Hammerstones are cobbles and pebbles with pitted ends commonly assumed to have been used at various stages of stone tool manufacture and for butchering activities.

Site EgNn 9

Cat.No. 2507 hammerstone, minimal battering along small section of rounded edge, possibly flint knapping tool, asymmetric ovate shaped pebble with flattened cross section

Material Type : silicified siltstone pebble

Measurements : length - 3.7 cm, width - 2.8 cm, thickness - 1.5 cm, weight - 22.8 gm

Provenience : Block 1 284.04N 234.30E Level 7 86 cm BD

Block 1 Occupation 5

Permit # 01-45

Cat.No. 2508 hammerstone, minimal battering along small sections of both proximal and distal ends, battering if off centered on both ends, ovate with ovate cross section

Material Type : brown quartzite

Measurements : length - 8.4 cm, width - 5.2 cm, thickness - 4.4 cm, weight - 267.6 gm

Provenience : Block 1 285.63N 237.19E Level 6 79 cm BD

Block 1 Occupation 4

Permit # 01-45

Expediency Tools

Expediency tools are characterized by finishing and sharpening confined to the margins of the tool. Retouched flakes exhibit patterned unifacial or bifacial flaking along portions of one or more margins of the tool. Utilized flakes exhibit flake removal due to the utilization of the natural sharpness of the flake.

Site EgNn 9

Cat.No. 16 utilized flake, unifacial flake removal along section of both lateral edges
Material Type : Knife River flint
Provenience : surface collection
Permit # 99-19

Cat.No. 23 retouched flake, well patterned bifacial retouch along one lateral edge, steep angle unifacial retouch along opposite edge, multi-use tools
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 24 retouched flake, well patterned unifacial retouch and unifacial utilization along one lateral edge, unifacial utilization along portion of opposite edge
Material Type : mixed tan chert
Provenience : surface collection
Permit # 99-19

Cat.No. 25 retouched flake, well patterned unifacial retouch along both lateral edges
Material Type : grey porcellanite
Provenience : surface collection
Permit # 99-19

Cat.No. 27 retouched flake, well patterned unifacial retouch along one edge, unifacial battering and moderately patterned unifacial retouch along opposite edge, possibly scraper preform
Material Type : mixed red quartzite

Provenience : surface collection
Permit # 99-19

Cat.No. 28 retouched flake, moderately patterned unifacial retouch along irregularly shaped lateral edge
Material Type : heat treated Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 31 retouched flake, well patterned unifacial retouch along one irregularly shaped edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 32 retouched flake, well patterned steep angle unifacial retouch along lateral edge of exhausted bipolar core, proximal/distal ends show use as wedge until one end of wedge broke
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 36 retouched flake, unifacial battering and moderately patterned unifacial retouch along one edge, minimal shaping of dorsal surface, possibly scraper preform
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 38 retouched flake, moderately patterned unifacial retouch along one edge of secondary decortication flake fragment
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 48 retouched flake, moderately patterned unifacial retouch along left lateral edge and distal end of secondary decortication flake, minimally patterned unifacial retouch along portion of right edge, possible use of distal end as chopper

Material Type : mixed grey quartzite

Provenience : surface collection

Permit # 99-19

Cat.No. 62 utilized flake, unifacial flake removal along right lateral edge

Material Type : heat treated Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 70 retouched flake, well patterned unifacial retouch along right lateral edge (portion of edge broken)

Material Type : heat treated Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 77 retouched flake, moderately patterned unifacial retouch along one edge

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 98 retouched flake, minimally patterned unifacial retouch along one edge

Material Type : patinated brown silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 106 retouched flake, well patterned bifacial retouch along one edge

Material Type : patinated brown silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 113 retouched flake, moderately patterned unifacial retouch along one lateral edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 130 utilized flake, unifacial flake removal along one edge
Material Type : mixed red chert
Provenience : surface collection
Permit # 99-19

Cat.No. 148 utilized flake, bifacial flake removal along distal end of bipolar flake
Material Type : patinated yellow chalcedony
Provenience : surface collection
Permit # 99-19

Cat.No. 168 retouched flake, minimally patterned unifacial retouch along one edge
Material Type : white silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 170 retouched flake, well patterned unifacial retouch along one lateral edge and portion of opposite edge
Material Type : mottled grey chalcedony
Provenience : surface collection
Permit # 99-19

Cat.No. 172 retouched flake, well patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 175 utilized flake, unifacial flake removal along one edge
Material Type : heat damaged silicified wood

Provenience : surface collection
Permit # 99-19

Cat.No. 181 retouched flake, minimally patterned bifacial retouch along one edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 186 retouched flake, minimally patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 192 utilized flake, unifacial flake removal along one edge and portion of opposite edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 193 retouched flake, moderately patterned bifacial retouch along both lateral edges although one of edges shows steep angle unifacial retouch with minimal bifacial flake removal
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 197 utilized flake, unifacial flake removal along lateral edge with small section of unifacial retouch along distal end
Material Type : mottled yellow chert
Provenience : surface collection
Permit # 99-19

Cat.No. 206 retouched flake, well patterned unifacial retouch along one broken edge

Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 228 utilized flake, unifacial flake removal along one edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 235 retouched flake, moderately patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 254 retouched flake, moderately patterned unifacial retouch along portion of one lateral edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 269 retouched flake, well patterned unifacial retouch along one broken edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 291 retouched flake, minimally patterned unifacial retouch along one broken edge
Material Type : white silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 292 utilized flake, unifacial flake removal along one edge
Material Type : brown silicified wood

Provenience : surface collection
Permit # 99-19

Cat.No. 293 retouched flake, moderately patterned unifacial retouch along one pointed end of flake fragment
Material Type : patinated yellow silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 295 retouched flake, well patterned unifacial retouch along both lateral edges of flake fragment, minimally patterned unifacial retouch along portion of distal end
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 300 retouched flake, minimally patterned unifacial retouch along one lateral edge
Material Type : patinated yellow chalcedony
Provenience : surface collection
Permit # 99-19

Cat.No. 302 retouched flake, minimally patterned bifacial retouch along one lateral edge, minimally patterned unifacial retouch along opposite edge
Material Type : brown silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 303 retouched flake, moderately patterned unifacial retouch along pointed end of flake
Material Type : brown silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 311 retouched flake, moderately patterned unifacial retouched along one broken edge

Material Type : heat treated Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 322 retouched flake, well patterned unifacial retouch along both lateral edges of broken resharpening flake

Material Type : Knife River flint

Provenience : surface collection

Permit # 99-19

Cat.No. 328 retouched flake, minimally patterned bifacial retouch along one broken edge

Material Type : brown silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 347 retouched flake, minimally patterned unifacial retouch along pointed end of flake fragment

Material Type : heat treated Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 384 retouched flake, well patterned unifacial retouch along one edge of flake fragment

Material Type : Knife River flint

Provenience : surface collection

Permit # 99-19

Cat.No. 415 retouched flake, well patterned unifacial retouch along one broken edge

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 620 retouched flake, well patterned unifacial retouch along one broken edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 656 retouched flake, moderately patterned unifacial retouch along one broken edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 685 retouched flake, moderately patterned unifacial retouch along both broken lateral edges
Material Type : brown silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 699 retouched flake, moderately patterned bifacial retouch along one broken edge
Material Type : patinated yellow silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 703 retouched flake, moderately patterned unifacial retouch along one broken edge
Material Type : mottled grey chert
Provenience : surface collection
Permit # 99-19

Cat.No. 705 retouched flake, moderately patterned bifacial retouch along one broken edge

Material Type : Knife River flint
Provenience : surface collection
Permit # 99-19

Cat.No. 737 retouched flake, moderately patterned unifacial retouch along convex section of one edge
Material Type : mixed grey quartzite
Provenience : surface collection
Permit # 99-19

Cat.No. 743 retouched cobble spall, moderately patterned unifacial retouch along one convex edge and distal end
Material Type : mixed yellow quartzite
Provenience : surface collection
Permit # 99-19

Cat.No. 759 retouched flake, minimally patterned unifacial retouch along one edge
Material Type : banded grey quartzite
Provenience : surface collection
Permit # 99-19

Cat.No. 765 retouched flake, moderately patterned unifacial retouch along both lateral edges and distal end, minimal shaping of dorsal surface of flake
Material Type : mixed yellow quartzite
Provenience : surface collection
Permit # 99-19

Cat.No. 841 utilized flake, alternating unifacial and bifacial flake removal along one edge
Material Type : Knife River flint
Provenience : Shovel Test # 10 20-40 cm BS
Permit # 00-31

Cat.No. 847 retouched flake, moderately patterned bifacial retouch along both lateral edges, proximal end of flake broken and concave surface shows moderately patterned unifacial retouch

Material Type : Swan River chert

Provenience : Shovel Test # 21 45-60 cm BS
Block 2 Occupation 5

Permit # 00-31

Cat.No. 882 retouched flake, moderately patterned unifacial retouch along one convex lateral edge

Material Type : Swan River chert

Provenience : 291N 246E 40-50 cm BS
Block 2 Occupation 5

Permit # 00-31

Cat.No. 899 retouched flake, minimally patterned unifacial retouch along one edge

Material Type : Swan River chert

Provenience : 281N 245E 40-50 cm BS

Permit # 00-31

Cat.No. 1012 retouched flake, moderately patterned unifacial retouch along broken edge

Material Type : Swan River chert

Provenience : 195N 291E 15-20 cm BS

Permit # 00-31

Cat.No. 1042 retouched flake, moderately patterned unifacial retouch along one edge, other edge broken but orientation of retouch suggests it was also modified

Material Type : Swan River chert

Provenience : surface collection Area 3

Permit # 00-31

Cat.No. 1046 retouched flake, moderately patterned unifacial retouch along broken edge

Material Type : brown silicified wood

Provenience : 195N 251E 30-40 cm BS

Permit # 00-31

Cat.No. 1057 retouched flake, well patterned unifacial retouch along broken edge

Material Type : Swan River chert

Provenience : 195N 251E 30-40 cmBS

Permit # 00-31

Cat.No. 1075 retouched flake, minimally patterned unifacial retouch along broken edge

Material Type : Swan River chert

Provenience : 195N 251E 30-40 cm BS

Permit # 00-31

Cat.No. 1076 retouched flake, minimally patterned unifacial retouch along broken edge

Material Type : Swan River chert

Provenience : 195N 251E 30-40 cm BS

Permit # 00-31

Cat.No. 1098 retouched flake, moderately patterned unifacial retouch along one edge

Material Type : Swan River chert

Provenience : surface collection Area 3

Permit # 00-31

Cat.No. 1100 retouched flake, minimally patterned unifacial retouch along one edge

Material Type : mixed grey quartzite

Provenience : surface collection Area 3

Permit # 00-31

Cat.No. 1102 retouched flake, moderately patterned unifacial retouch along both lateral edges, possibly proximal end of scraper

Material Type : mottled grey chert

Provenience : surface collection Area 3

Permit # 00-31

Cat.No. 1113 retouched flake, moderately patterned unifacial retouch along broken edge

Material Type : white quartz

Provenience : surface collection Area 3

Permit # 00-31

Cat.No. 2479 retouched flake fragment, moderately patterned unifacial retouch along one edge

Material Type : mottled grey chert

Provenience : Block 1 284.20N 234.33E Level 7 88 cm BD
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2480 utilized flake, bifacial flake removal off sections of both lateral edges

Material Type : heat damaged red chert

Provenience : Block 1 284.60N 234.33E Level 5 68 cm BD
Block 1 Occupation 4

Permit # 01-45

Cat.No. 2481 retouched flake fragment, moderately patterned unifacial retouch along both lateral edges on alternate faces

Material Type : Swan River chert

Provenience : Block 1 284N 234E Level 8
Block 1 Occupation 6

Permit # 01-45

Cat.No. 2482 retouched flake, moderately patterned unifacial retouch along one edge, relatively steep angle (use as scraper)

Material Type : arenaceous chert
Provenience : Block 1 284N 234E Level 7
Block 1 Occupation 5
Permit # 01-45

Cat.No. 2483 utilized flake, unifacial flake removal along portion of one edge
Material Type : mottled grey quartzite
Provenience : Block 1 284.65N 234.90E Level 7 86 cm BD
Block 1 Occupation 5
Permit # 01-45

Cat.No. 2484 retouched flake, moderately patterned unifacial retouch along section of one edge
Material Type : mixed grey quartzite
Provenience : Block 1 284.08N 235.77E Level 9 102 cm BD
Block 1 Occupation 7
Permit # 01-45

Cat.No. 2485 retouched flake, moderately patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : Block 1 284.16N 235.86E Level 7 83 cm BD
Block 1 Occupation 5
Permit # 01-45

Cat.No. 2486 retouched flake, well patterned unifacial retouch along both lateral edges and convex distal end of reshaping flake, relatively steep angle (use as scraper)
Material Type : brown silicified peat
Provenience : Block 1 284.36N 237.65E Level 5 70 cm BD
Block 1 Occupation 4
Permit # 01-45

Cat.No. 2487 retouched flake fragment, minimally patterned unifacial retouch along one edge

Material Type : brown silicified peat
Provenience : Block 1 284N 237E Level 6
Block 1 Occupation 4
Permit # 01-45

Cat.No. 2488 retouched flake fragment, well patterned bifacial retouch along one edge, possibly extreme lateral margin of biface
Material Type : Swan River chert
Provenience : Block 1 284N 237E Level 6
Block 1 Occupation 4
Permit # 01-45

Cat.No. 2489 retouched flake, minimally patterned unifacial retouch along portion of one edge
Material Type : mottled yellow quartzite
Provenience : Block 1 285.04N 234.31E Level 7 86 cm BD
Block 1 Occupation 5
Permit # 01-45

Cat.No. 2490 retouched flake, moderately patterned unifacial retouch along portion of one edge
Material Type : brown silicified peat
Provenience : Block 1 285.58N 236.44E Level 2 40 cm BD
Block 1 Occupation 2
Permit # 01-45

Cat.No. 2491 retouched flake fragment, well patterned unifacial retouch along one edge
Material Type : mixed white chalcedony
Provenience : Block 1 285N 237E Level 5
Block 1 Occupation 4
Permit # 01-45

Cat.No. 2492 retouched flake, moderately patterned unifacial retouch along concave portion of one edge

Material Type : Knife River flint

Provenience : Block 1 285N 237E Level 6
Block 1 Occupation 4

Permit # 01-45

Cat.No. 2493 retouched flake fragment, well patterned unifacial retouch along one edge

Material Type : Swan River chert

Provenience : Block 1 286N 234E Level 7
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2494 retouched flake, minimally patterned unifacial retouch along portion of both lateral edges

Material Type : Swan River chert

Provenience : Block 1 286N 234E Level 7
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2495 retouched flake, moderately patterned unifacial retouch along one edge, attempt at bifacial thinning along small section of same edge

Material Type : Montana chert

Provenience : Block 1 286.63N 234.80E Level 7 84 cm BD
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2496 retouched flake, well patterned unifacial retouch along one edge

Material Type : brown silicified peat

Provenience : Block 1 286.69N 234.59E Level 7 86 cm BD
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2497 utilized flake fragment, unifacial flake removal along portion of both lateral edges

Material Type : heat treated Swan River chert

Provenience : Block 1 286.89N 234.78E Level 7 83 cm BD
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2498 retouched flake, minimally patterned unifacial retouch along portion of one edge

Material Type : miscellaneous fine grained material

Provenience : Block 1 286.47N 235.51E Level 6 73 cm BD
Block 1 Occupation 4

Permit # 01-45

Cat.No. 2499 retouched flake fragment, minimally patterned unifacial retouch along portions of both edges, refits with Cat.No. 2500

Material Type : Swan River chert

Provenience : Block 1 286N 235E Level 7
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2500 retouched flake fragment, see above

Material Type : Swan River chert

Provenience : Block 1 286.08N 235.30E Level 7 82 cm BD
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2501 retouched flake, moderately patterned unifacial retouch along one edge, relatively steep angle (use as scraper)

Material Type : purple quartzite

Provenience : Block 1 286.06N 235.95E Level 7 81 cm BD
Block 1 Occupation 5

Permit # 01-45

Cat.No. 2502 retouched flake, minimally patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : Block 1 286.68N 236.10E Level 1 21 cm BD
Block 1 Occupation 1
Permit # 01-45

Cat.No. 2503 utilized flake, minimal unifacial flake removal along one edge
Material Type : heat treated Swan River chert
Provenience : Block 1 286.71N 236.71E Level 3 45 cm BD
Block 1 Occupation 3
Permit # 01-45

Cat.No. 2504 retouched flake fragment, moderately patterned unifacial retouch along one edge
Material Type : Knife River flint
Provenience : Block 1 286N 236E Level 6
Block 1 Occupation 4
Permit # 01-45

Cat.No. 2505 retouched flake, moderately patterned unifacial retouch along portion of both edges
Material Type : brown silicified peat
Provenience : Block 1 286.73N 236.77E Level 6 75 cm BD
Block 1 Occupation 4
Permit # 01-45

Cat.No. 2506 utilized flake fragment, minimal unifacial flake removal along one edge
Material Type : Knife River flint
Provenience : Block 1 286N 237E Level 6
Block 1 Occupation 4
Permit # 01-45

Cat.No. 2528 retouched flake, moderately patterned bifacial retouch and battering along one edge, possibly wedge fragment

Material Type : Swan River chert
Provenience : Block 2 288.51N 246.18E Level 5 64 cm BD
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2529 retouched flake, minimal unifacial retouch along one edge
Material Type : brown silicified wood
Provenience : Block 2 288.87N 246.15E Level 5 62 cm BD
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2530 utilized flake, minimal unifacial flake removal along small sections of both edges
Material Type : Swan River chert
Provenience : Block 2 288N 246E Level 7
Block 2 Occupation 6
Permit # 01-45

Cat.No. 2531 retouched flake fragment, minimal unifacial retouch along one edge
Material Type : Knife River flint
Provenience : Block 2 288N 247E Level 4
Block 2 Occupation 4
Permit # 01-45

Cat.No. 2532 retouched flake fragment, moderately patterned unifacial retouch along one edge, relatively steep angle retouch (use as scraper)
Material Type : Swan River chert
Provenience : Block 2 289.87N 248.26E Level 4 56 cm BD
Block 2 Occupation 4
Permit # 01-45

Cat.No. 2533 utilized flake, minimal unifacial flake removal along one concave section (use as spokeshave)
Material Type : heat treated silicified wood

Provenience : Block 2 289N 245E Level 5
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2534 retouched flake, moderately patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : Block 2 289.03N 245.74E Level 5 61 cm BD
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2535 retouched cobble spall / chopper, moderately patterned alternating unifacial retouch along section of distal end
Material Type : tan limestone
Provenience : Block 2 289.38N 245.33E Level 5 67 cm BD
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2536 retouched flake, moderately patterned unifacial retouch along one edge on dorsal surface and along opposite edge on ventral surface
Material Type : brown silicified wood
Provenience : Block 2 289.97N 246.74E Level 5 65 cm BD
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2537 retouched flake fragment, minimally patterned unifacial retouch along one edge, surface smoothed after retouch
Material Type : Swan River chert
Provenience : Block 2 289N 246E Level 6
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2538 retouched flake, moderately patterned unifacial retouch along section of one edge
Material Type : heat treated Swan River chert

Provenience : Block 2 289.37N 248.51E Level 4 50 cm BD
Block 2 Occupation 4
Permit # 01-45

Cat.No. 2539 retouched flake, minimally patterned unifacial retouch along section of one edge
Material Type : brown silicified wood
Provenience : Block 2 289.54N 248.99E Level 5 60 cm BD
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2540 retouched flake fragment, moderately patterned unifacial retouch along section of one edge
Material Type : heat treated Swan River chert
Provenience : Block 2 290N 246E Level 3
Block 2 Occupation 3
Permit # 01-45

Cat.No. 2541 utilized flake, minimally patterned unifacial flake removal along one edge
Material Type : Knife River flint
Provenience : Block 2 290N 246E Level 5
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2542 retouched flake fragment, minimally patterned unifacial retouch along one edge
Material Type : mottled tan chert
Provenience : Block 2 290N 246E Level 5
Block 2 Occupation 5
Permit # 01-45

Cat.No. 2543 utilized flake, minimal unifacial flake removal along sections of both lateral edges

Material Type : brown silicified peat

Provenience : Block 2 290.52N 246.50E Level 5 67 cm BD
Block 2 Occupation 5

Permit # 01-45

Cat.No. 2544 retouched core / failed preform, moderately patterned bifacial retouch along one lateral edge and one end, moderate unifacial flaking on opposite end, preform utilized when shaping failed

Material Type : heat treated silicified wood

Provenience : Block 2 290.64N 246.57E Level 5 71 cm BD
Block 2 Occupation 5

Permit # 01-45

Cat.No. 2545 retouched spall fragment, minimal unifacial retouch along both lateral edges and distal end, possibly early stage preform, refits with Cat.No. 2552

Material Type : banded purple quartzite

Provenience : Block 2 290.05N 247.03E Level 6 72 cm BD
Block 2 Occupation 5

Permit # 01-45

Figure A4-D

Cat.No. 2546 retouched flake fragment, well patterned unifacial retouch along one edge

Material Type : Swan River chert

Provenience : Block 2 291.92N 247.96E Level 4 53 cm BD
Block 2 Occupation 4

Permit # 01-45

Cat.No. 2547 utilized flake, minimal unifacial flake removal along section of one edge

Material Type : brown silicified wood

Provenience : Block 2 291.77N 247.81E Level 5 64 cm BD
Block 2 Occupation 5

Permit # 01-45

Cat.No. 2548 retouched flake fragment, moderately patterned unifacial retouch along one edge

Material Type : brown silicified wood

Provenience : Block 2 292.04N 246.53E Level 5 67 cm BD
Block 2 Occupation 5

Permit # 01-45

Cat.No. 2549 retouched flake fragment, moderately patterned unifacial retouch along one edge

Material Type : brown silicified wood

Provenience : Block 2 292N 247E Level 5
Block 2 Occupation 5A

Permit # 01-45

Cat.No. 2550 retouched flake fragment, moderately patterned bifacial retouch along one edge, possibly lateral edge fragment of biface

Material Type : brown silicified wood

Provenience : Block 2 292N 247E Level 6
Block 2 Occupation 5A

Permit # 01-45

Cat.No. 2551 retouched core fragment, moderately patterned unifacial retouch along one edge

Material Type : mottled yellow quartzite

Provenience : Block 2 288.65N 246.67E Level 6 72 cm BD
Block 2 Occupation 5

Permit # 01-45

Cat.No. 2552 retouched spall fragment, refits with Cat.No. 2545, see above for description

Material Type : banded purple quartzite

Provenience : Block 2 289.68N 247.77E Level 5 65 cm BD
Block 2 Occupation 5

Permit # 01-45

Figure A4-D

Expediency Tool Measurements, Site EgNn 9

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
16	2.5	1.5	0.6	1.6
23	2.6*	1.8	0.6	2.7*
24	2.1	1.3	0.4	0.9
25	2.4*	1.6	0.3	1.0*
27	3.4	2.7	0.9	10.6
28	2.5*	1.5	0.5	1.7*
31	2.8*	2.2*	0.9*	4.7*
32	3.8	3.1	1.2	12.7
36	4.8	3.0	1.6	20.9
38	5.9	6.1	2.2	73.5
48	12.1	9.4	2.9	362.3
62	4.0	2.8	1.3	9.4
70	3.9	2.2	1.3	9.6
77	2.7*	1.5*	1.0	3.4*
98	2.4*	2.7	0.8	5.3*
106	2.0*	1.3*	0.4*	0.9*
113	2.0	2.3	0.4	1.5
130	2.0	1.6	1.0	3.0
148	2.3	1.7	0.5	1.9
168	3.1	2.5	1.0	6.3
170	2.2	1.8	0.4	1.6
172	2.6	1.6	0.4	1.3
175	2.0	1.9	0.5	1.9
181	2.7	1.9	1.0	2.6
186	3.8	2.3	1.1	7.0
192	3.0	1.8	0.8	3.8
193	2.0	1.8	0.5	1.9
197	2.0	1.4	0.4	1.1
206	2.2*	2.0	0.6	2.7*
228	2.2	2.1	0.4	1.6
235	4.9	3.8	0.7	13.2
254	4.4	2.4	0.9	10.2
269	2.8	2.4	0.8	5.4
291	2.5	2.0	0.5	3.2
292	2.2	1.5	0.4	1.5
293	2.0	1.5	0.6	2.2
295	1.7*	1.8	0.3	1.0*
300	2.4	1.7	1.0	2.8
302	2.3	2.2	0.4	2.8
303	3.5	1.8	0.8	3.7
311	1.8*	1.7*	0.6	1.9*
322	2.0	1.5	0.3	0.9

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
328	1.8*	1.4	0.3	0.4*
347	2.0	1.8	0.4	0.8
384	1.7	1.1	0.3	0.4
415	1.1*	0.9*	0.3	0.3*
620	1.1*	1.1*	0.4*	0.4*
656	1.6*	1.8*	0.7*	2.0*
685	1.3*	1.3	0.3	0.4*
699	1.3*	1.0*	0.4*	0.5*
703	1.0*	1.4*	0.4*	0.7*
705	1.7*	0.6*	0.2*	0.1*
737	5.8	3.2	1.5	20.0
743	11.3	8.5	3.6	368.6
759	4.7	3.9	1.1	26.1
765	6.1	3.9	1.4	36.1
841	2.3	1.4	0.5	1.2
847	2.4	2.0	0.6	2.7
882	6.3	4.3	1.7	42.1
899	2.2	1.6	0.6	2.4
1012	2.9*	2.2	0.8	5.6*
1046	2.5*	1.6*	0.6	1.6*
1075	1.3*	1.7	0.3	0.8*
1076	1.4*	1.0*	0.5*	0.6*
1098	1.9	2.0	0.7	2.2
1100	6.0	3.9	1.7	43.1
1102	1.9*	1.6	0.4	1.2*
1113	1.4	0.9*	0.3	0.2*
2479	3.0*	3.7*	1.3*	13.3*
2480	2.7	1.8	0.3	1.6
2481	2.1*	1.6*	0.4*	1.4*
2482	2.0	2.5	0.5	2.2
2483	3.1	2.0	1.0	7.0
2484	5.8	4.2	1.3	35.2
2485	4.0	3.9	1.1	17.4
2486	2.8	1.9	0.5	3.0
2487	1.3*	0.8*	0.3*	0.3*
2488	1.3*	0.9*	0.3*	0.2*
2489	11.3	3.9	1.8	72.8
2490	1.9	2.1	0.4	1.4
2491	1.8*	1.5*	0.4*	1.0*
2492	1.1	1.6	0.4	0.5
2493	3.0*	2.3*	0.6*	4.4*
2494	2.7	2.2	0.9	3.4
2495	3.3	2.9	0.8	9.8

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
2496	2.3	1.5	0.3	0.9
2497	2.3*	2.1*	0.3*	1.3*
2498	3.4	2.2	0.8	6.7
2499	2.4	1.3	0.5	1.1
2500	refit	see above		
2501	4.1	2.8	0.7	9.3
2502	3.4	3.2	0.8	8.8
2503	2.4	2.2	1.1	5.1
2504	1.2*	1.7*	0.2*	0.3*
2505	3.5	2.3	0.5	3.7
2506	1.2*	0.9*	0.3*	0.1*
2528	1.9	1.4	0.5	1.3
2529	2.3	1.7	0.6	2.0
2530	3.2	1.9	0.5	2.7
2531	1.4*	2.1*	0.5*	1.4*
2532	2.0*	2.5*	0.5*	2.7*
2533	1.7	1.6	0.2	0.4
2534	2.2	1.9	0.4	2.1
2535	12.8	10.4	3.3	451.4
2536	2.5	2.6	0.8	3.9
2537	1.5*	2.2*	0.4*	1.4*
2538	2.1	1.3	0.3	0.6
2539	2.2	2.4	0.5	3.0
2540	1.4*	2.3*	0.5*	2.0*
2541	1.1	0.6	0.2	0.1
2542	0.9*	0.8*	0.3*	0.1*
2543	1.9	1.5	0.4	0.9
2544	6.9	5.1	2.6	88.1
2545	9.8	8.0	2.7	246.5
2546	2.9*	1.7*	0.7*	4.1*
2547	2.7	1.8	0.4	1.7
2548	2.1*	1.6*	0.4*	0.9*
2549	1.7*	0.7*	0.4*	0.3*
2550	1.3*	1.1*	0.3*	0.3*
2551	6.4	5.9	3.4	103.7
2552	see 2545			

* indicates incomplete measurement, broken tool

APPENDIX B

LITHIC TOOL DESCRIPTIONS

EgNo 23

Projectile Points and Point Fragments

Projectile points are specialized bifacial tools, commonly assumed to have been used for the hunting of game. Generally they are symmetric bifacially shaped and retouched forms with specialized hafting modifications. Three general classes are commonly recognized including thrusting spear points, atlatl dart points, and arrow points. Projectile points have been used as 'index fossils' to classify archaeological time periods and cultures.

Site EgNo 23

Cat.No. 75 Besant projectile point, moderately finished, hinging visible on dorsal and ventral surfaces which may have contributed to low level of finishing, broken horizontally along extreme end of base, shallow wide side notches showing crushing due to hafting, slightly asymmetric triangular body, sinuous lateral edges, biconvex cross section

Material Type : grey porcellanite

Provenience : surface collection

Permit # 99-19

Figure B1-U

Cat.No. 76 Besant projectile point base fragment, well finished, broken horizontally through body, shallow rounded side notches, notches show grinding, rounded basal edges, straight base showing basal thinning and grinding, biconvex cross section, relatively thin

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B1-E

Cat.No. 77 projectile point base fragment, well finished, rounded basal edges and basal notch, broken horizontally through stem, biconvex cross section, too fragmentary to confidently classify however rounded basal edges with basal notch is suggestive of Middle Period point styles

Material Type : grey porcellanite

Provenience : surface collection

Permit # 99-19

Figure B2-J

Cat.No. 78 broken projectile point, possible Hanna point, moderately finished, broken diagonally through stem, slightly asymmetric rounded triangular body, faint rounded shoulder, body constricts slightly to shoulder, shallow poorly defined notch, rounded basal edge, flaw in material has prevented extensive retouch and shaping of notch, other half of base is broken, asymmetric biconvex cross section

Material Type : white silicified wood

Provenience : surface collection

Permit # 99-19

Figure B1-K

Cat.No. 79 Avonlea projectile point, well finished, slight asymmetry in base due to flaw in material, triangular body with rounded lateral edges, rounded shoulder, side notched, rounded basal edges, basally indented and thinned, thin biconvex cross section

Material Type : Montana chert

Provenience : surface collection

Permit # 99-19

Figure B1-R

Cat.No. 80 flake point, possibly Late Period, side notched, bifacial retouch limited to lateral edges of the form (body, notches, base), dorsal surface retains flake arris, asymmetric triangular body, rounded convex base with minimal finishing, one lateral edge shows sharp shoulder and wide side notch while other shows rounded shoulder and shallow side notch, planoconvex cross section

Material Type : brown chalcedony

Provenience : surface collection

Permit # 99-19

Figure B1-S

Cat.No. 81 broken projectile point, corner notched flake point, possibly Pelican Lake, tip missing and impact scar extends down body on dorsal surface, triangular body with sharp shoulders, wide corner notches, one basal edge broken while other is flared/pointed, rounded convex base with basal thinning, moderate finishing on dorsal surface, ventral surface retains compression rings of flake surface, asymmetric planoconvex cross section, arrow-sized

Material Type : brown chalcedony

Provenience : surface collection

Permit # 99-19

Figure B1-G

Cat.No. 82 projectile point base fragment, broken horizontally through medial portion of body, body shows relatively straight lateral edges, shallow side notches, one rounded basal edge (other broken), slightly concave base with basal thinning, moderately finished, biconvex cross section, too damaged to confidently classify as to point style, size indicative of Late Period arrow point

Material Type : too heat damaged to identify material type

Provenience : surface collection

Permit # 99-19

Figure B2-F

Cat.No. 83 projectile point fragment, well finished, broken horizontally across top portion of body, tip missing with impact scar which extends to middle of body, relatively straight lateral edges on body, shallow side notches, rounded basal edges, slightly concave base with basal thinning, thin biconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B2-G

Cat.No. 85 projectile point fragment, well finished, broken horizontally directly below shoulders, asymmetric rounded triangular body, impact scar at tip, thin biconvex cross section, base missing so difficult to classify, possibly Late Period

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B2-C

Cat.No. 88 projectile point fragment, moderately finished, rounded triangular body, unfinished asymmetric tip, rounded shoulders, broken across stem and base partially reworked, asymmetric biconvex cross section, too incomplete and unfinished to classify

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B1-T

Cat.No. 283 projectile point fragment, well finished, base and lateral fragment of McKean point, rounded basal edge, indented base, point broken along medial axis of tool, tip missing and one surface of tool also missing

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B1-Q

Cat.No. 442 projectile point fragment, base and body fragment, broken laterally through tool as well as medially through cross section, small well defined side notch present too fragmentary to define orientation of tool, possibly Late Period

Material Type : brown silicified wood

Provenience : surface collection

Permit # 99-19

Figure B2-E

Cat.No. 1474 projectile point fragment, broken Hanna point, well finished, base and body fragment, impact fracture has broken point laterally and across one face of point, broad shallow side notch with rounded basal edges and shallow basal notch which gives eared appearance, biconvex cross section on broken portion

Material Type : Swan River chert

Provenience : 267N 194E Level 6A

Permit # 00-31

Figure B1-L

Cat.No. 1480 projectile point fragment, well finished base and body fragment, triangular body with slightly convex lateral edges, pronounced shoulders rounding down into stemmed base creating a tapered stem, straight base, dorsal surface of stem shows pot lidding, biconvex cross section, possibly Middle Period / Pelican Lake point

Material Type : heat treated Swan River chert

Provenience : 270N 183E Level 6

Permit # 00-31

Figure B1-H

Cat.No. 1485 reworked Hanna point, reworking has created asymmetric appearance, reworking has produced beveled right lateral edge to body, resharpening and reshaping with rounded tip, broad shallow side notches and basal notch which gives eared appearance, right basal edge is minimally worked due to flaw in material, left basal edge is rounded, asymmetric cross section

Material Type : heat treated Swan River chert

Provenience : 265N 200E Level 6

Permit # 00-31

Figure B1-M

Cat.No.1490 Besant point, moderately finished, slightly asymmetric triangular body, broad shallow side notches, rounded basal edges, slightly convex base, slightly asymmetric biconvex cross section

Material Type : brown silicified wood

Provenience : 269N 183E Level 1

Main Block Occupation 1

Permit # 00-31

Figure B1-B

Cat.No. 1499 McKean point, well finished, tip has been reworked and is slightly asymmetric, parallel lateral edges, broad basal notch, damage to basal edge gives eared appearance, biconvex cross section

Material Type : Swan River chert

Provenience : surface collection Area 1

Permit # 00-31

Figure B1-O

Cat.No. 1500 Besant point, moderately finished, left lateral edge broken and partially reworked, shallow broad side notches, straight base, small rounded basal edges, slightly asymmetric biconvex cross section

Material Type : Swan River chert

Provenience : surface collection Area 1

Permit # 00-31

Figure B1-D

Cat.No. 1501 Hanna point, minimally finished, asymmetric, left side of point shows unifacial retouch limited to margin of lateral edge and moderately finished bifacial retouch from shoulder to basal edge, right side of point shows minimal shaping of basal edge, broad shallow basal notch, asymmetric planoconvex cross section

Material Type : basalt

Provenience : surface collection Area 1

Permit # 00-31

Figure B1-J

Cat.No. 5063 projectile point base fragment, possibly Besant, broken across body just above the shoulders, moderately finished, shallow side notches, one basal edge is poorly finished rounded shape while other is pointed, slightly convex base, one face of base is broken / finishing removed across surface of base

Material Type : mixed grey chalcedony

Provenience : Main Block 264N 185E Level 6

Permit # 01-45

Figure B2-H

Cat.No. 5064 projectile point base fragment, well finished, broken across tool just below shoulders, rounded basal edges, notch broken out of base of an originally straight base

Material Type : Swan River chert

Provenience : Main Block 264N 189E Level 9
Main Block Cultural Level 4

Permit # 01-45

Figure B2-I

Cat.No. 5065 reworked McKean point, well finished, one lateral edge has been reworked so is slightly asymmetric, one surface shows hinge fracture but opposite face has been moderately finished, convex triangular body, notched base with basal thinning, slightly asymmetric biconvex cross section, point possibly broken by impact fracture then one lateral edge and tip reworked

Material Type : red silicified wood

Provenience : Main Block 264N 193E Level 8

Permit # 01-45

Figure B1-P

Cat.No. 5066 reworked Besant point, well finished, one lateral edge including a portion of the side notch has been reworked giving point asymmetric shape, opposite lateral edge shows slightly convex body shape with shallow side notch located near base, pointed basal edge, straight though poorly finished base, extreme tip is broken

Material Type : brown silicified wood

Provenience : Main Block 265N 186E Level 2
Main Block Occupation 1

Permit # 01-45

Figure B1-C

Cat.No. 5067 broken Pelican Lake point, well finished, tip and upper portion of body broken, broken through stem, ends of barbs also broken, triangular body, deep corner notches, biconvex cross section

Material Type : heat treated brown chert

Provenience : Main Block 265N 199E Level 5
Main Block Occupation 2
Permit # 01-45
Figure B1-F

Cat.No. 5068 Duncan point base, well finished, broken across tool at shoulders, stem is slightly concave along lateral edges, shallow basal notch with rounded basal edges, slight damage to basal edges, biconvex cross section
Material Type : Swan River chert
Provenience : Main Block 265N 199E Level 6
Permit # 01-45
Figure B1-N

Cat.No. 5069 point base fragment, possibly Besant, moderately finished, broken at shoulders, shallow side notches extremely close to base, pointed basal edges, irregular straight base, biconvex cross section
Material Type : Swan River chert
Provenience : Main Block 267N 183E Level 3
Main Block Occupation 2
Permit # 01-45
Figure B2-K

Cat.No. 5070 Besant point, well finished, extreme tip is broken, triangular body with convex lateral edges, shallow side notches (one almost corner notched), pointed basal edges, notches near base, convex base, biconvex cross section
Material Type : brown silicified wood
Provenience : Main Block 270.10N 182.58E Level 2 36 cm BD
Main Block Occupation 1
Permit # 01-45
Figure B1-A

Cat.No. 5071 Hanna point, well finished although flaw in material prevented complete finishing of one surface and limited finishing of portions of opposite face, slightly asymmetric triangular body, one lateral edge more convex than other, broad

shallow side notches, shallow basal notch and rounded basal edges, rounded shoulders, asymmetric biconvex cross section

Material Type : grey porcellanite with inclusions

Provenience : Block 2 242.45N 230.98E Level 1 15 cm BD

Block 2 Component 1

Permit # 01-45
Figure B1-I

Cat.No. 5072 projectile point body fragment, well finished, extreme tip and base missing, too fragmentary to determine type, asymmetric biconvex cross section

Material Type : patinated Knife River flint

Provenience : Block 2 243N 229E Level 9

Block 2 Component 7

Permit # 01-45
Figure B2-D

Cat.No. 5073 projectile point tip fragment, well finished, too fragmentary to identify type or body shape, biconvex cross section

Material Type : mottled brown chalcedony

Provenience : Main Block 264N 190E Level 9

Main Block Cultural Level 4

Permit # 01-45
Figure B2-A

Cat.No. 5074 projectile point fragment, well finished, distal body fragment though extreme tip is missing, too fragmentary to identify type or body shape, biconvex cross section

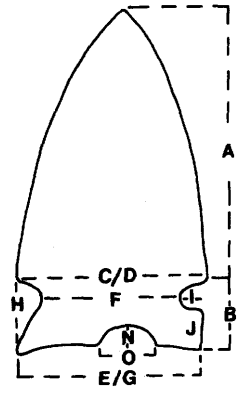
Material Type : Swan River chert

Provenience : Main Block 267N 183E Level 3

Main Block Occupation 2

Permit # 01-45
Figure B2-B

Projectile Point Measurements
(see next page)



Cat.No.	A (mm)	B (mm)	AB (mm)	C (mm)	D (mm)	F (mm)	E/G (mm)	H (mm)	I (mm)	J (mm)	K/L (mm)	N (mm)	O (mm)	M (gm)
75	22.06		31.23*	18.38	18.38	14.92		8.25	1.80		5.83*			3.6*
76		8.97	18.16*	21.42	21.42	16.96	19.07	5.18	2.08	2.70	5.68			2.3*
77		8.09*					16.56				4.97*	1.17	4.43	0.6*
78	19.01	9.30	28.31	16.33	16.11			5.93	1.24	3.81	5.32			2.1*
79	16.72	6.24	22.96	16.25	16.23	12.89	14.81	3.87	1.61	1.88	3.63	2.32	8.64	1.3
80	15.84	7.17	23.01	11.88	11.86	8.06	9.87	3.15	1.84	2.95	3.35			0.8
81		6.20	18.43*	12.71	12.71	6.54	9.28*	5.01	2.83	1.36	3.07			0.6*
82		7.33	14.73*	12.62	12.62	9.00	10.22*	5.46	1.06	2.54	4.40			0.9*
83		7.20	17.91*	13.38	13.15	10.61	11.66	4.68	0.92	3.17	4.94			1.3*
85	18.26			17.36							3.84			1.2*
88	22.42			16.85							5.15			1.9*
283			21.81*	8.88*							3.46*			0.6*
442			16.20*	12.92*							3.95*			0.8*
1474		13.21	21.80*	11.19*			14.82*	8.26	1.61	4.60	5.40*	2.14	7.93	1.5*
1480		6.75	16.80*	17.27	17.27	10.34	9.89				4.39			1.3*
1485	11.83	8.77	20.60	14.79	14.79	13.45	15.92	4.90	1.57	4.66	6.19	1.79	6.51	2.1
1490	16.90	8.95	25.85	19.26	19.26	16.64	18.53	5.21	1.22	1.90	4.36			2.3
1499			31.92	17.57			18.62				4.30	5.01	14.15	2.7
1500	21.71	8.62	30.33	21.49	21.49	17.15	18.88	6.10	2.10	1.80	6.77			4.4
1501	23.95	10.70	34.65	19.53	19.53	10.55	11.98	8.77	3.10	2.90	5.75	1.58	5.97	3.6
5063			8.23*		14.22	12.18	14.79	3.19	1.76	2.01	2.89*			0.4*
5064			8.80*			13.13	16.04				4.69*			0.7*
5065			26.99	20.27			14.18	7.63	2.21		5.37	2.43	10.71	2.7
5066	12.42*	8.71	21.13	14.89*		13.17	15.85	6.98	1.55	1.55	4.18			1.4*
5067			13.30*		15.83						3.19			0.6*
5068		18.09*			20.76		16.33			3.36	6.53*	1.47	9.20	2.6*
5069		7.47*			18.69*	14.82	15.05	4.57	1.57	1.49	4.43*			0.6*
5070	24.94*	9.22	34.16*	21.69	21.65	16.55	18.55	5.33	2.53	1.33	5.12			3.6*
5071	24.27	13.92	38.19	19.89	19.38		18.68	9.27	2.32	3.86	7.22	1.71	10.60	5.5
5072			10.86*	10.43*							2.64*			0.3*
5073			12.98*	11.68*							2.62*			0.1*
5074			11.63*	14.12*							3.99*			0.5*

* indicates incomplete measurement, broken tool

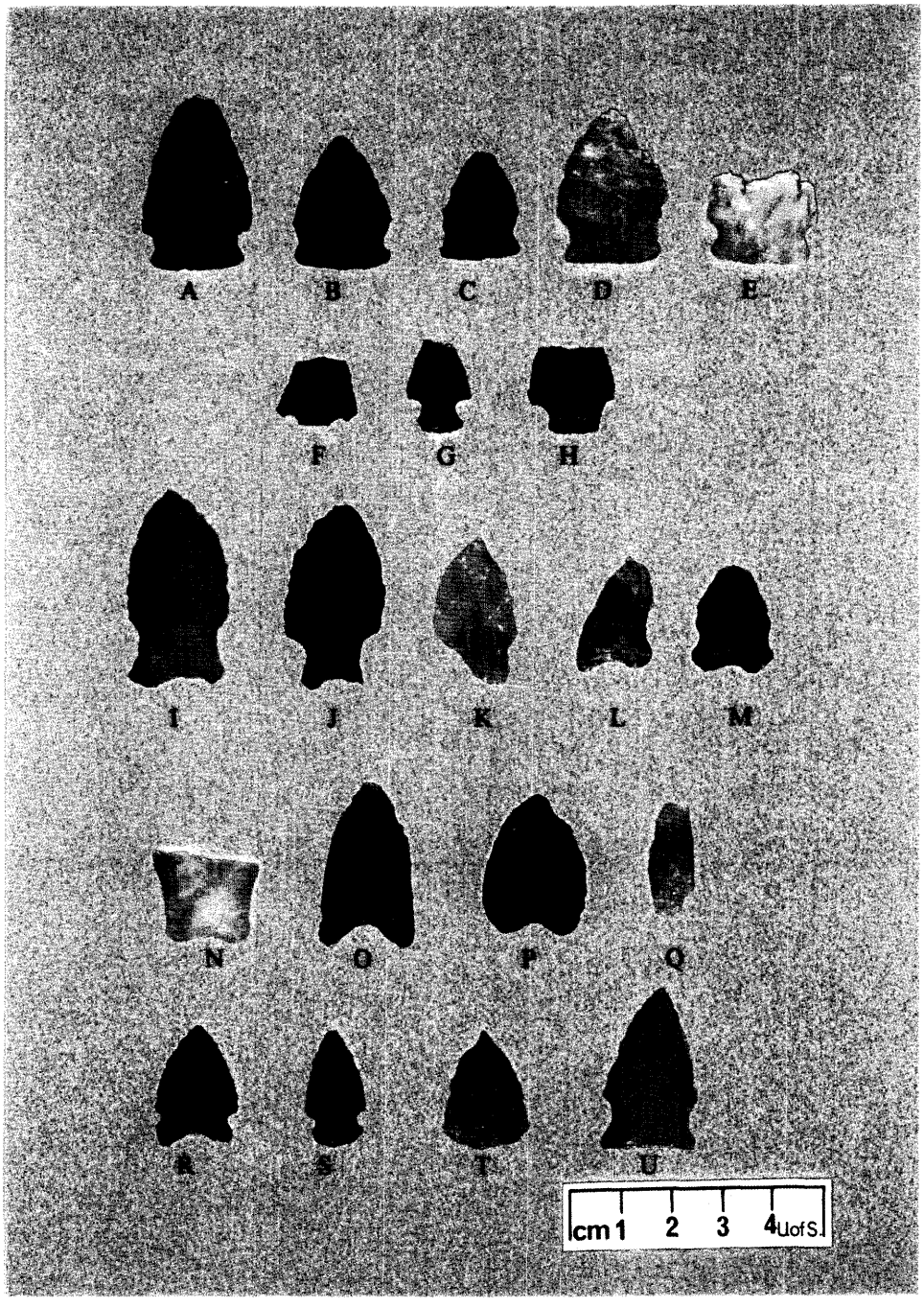


Figure B1

A - Besant point (5070), B - Besant point (1490), C - Besant point (5066), D - Besant point (1500), E - Besant point (76), F - Pelican Lake point (5067), G - Pelican Lake point (81), H - Pelican Lake point (1480), I - Hanna point (5071), J - Hanna point (1501), K - Hanna base (78), L - Hanna point (1474), M - Hanna point (1485), N - Duncan point (5068), O - McKean point (1499), P - McKean point (5065), Q - McKean point (283), R - Avonlea point (79), S - Late Period (80), T - point body, U - Besant point (75).

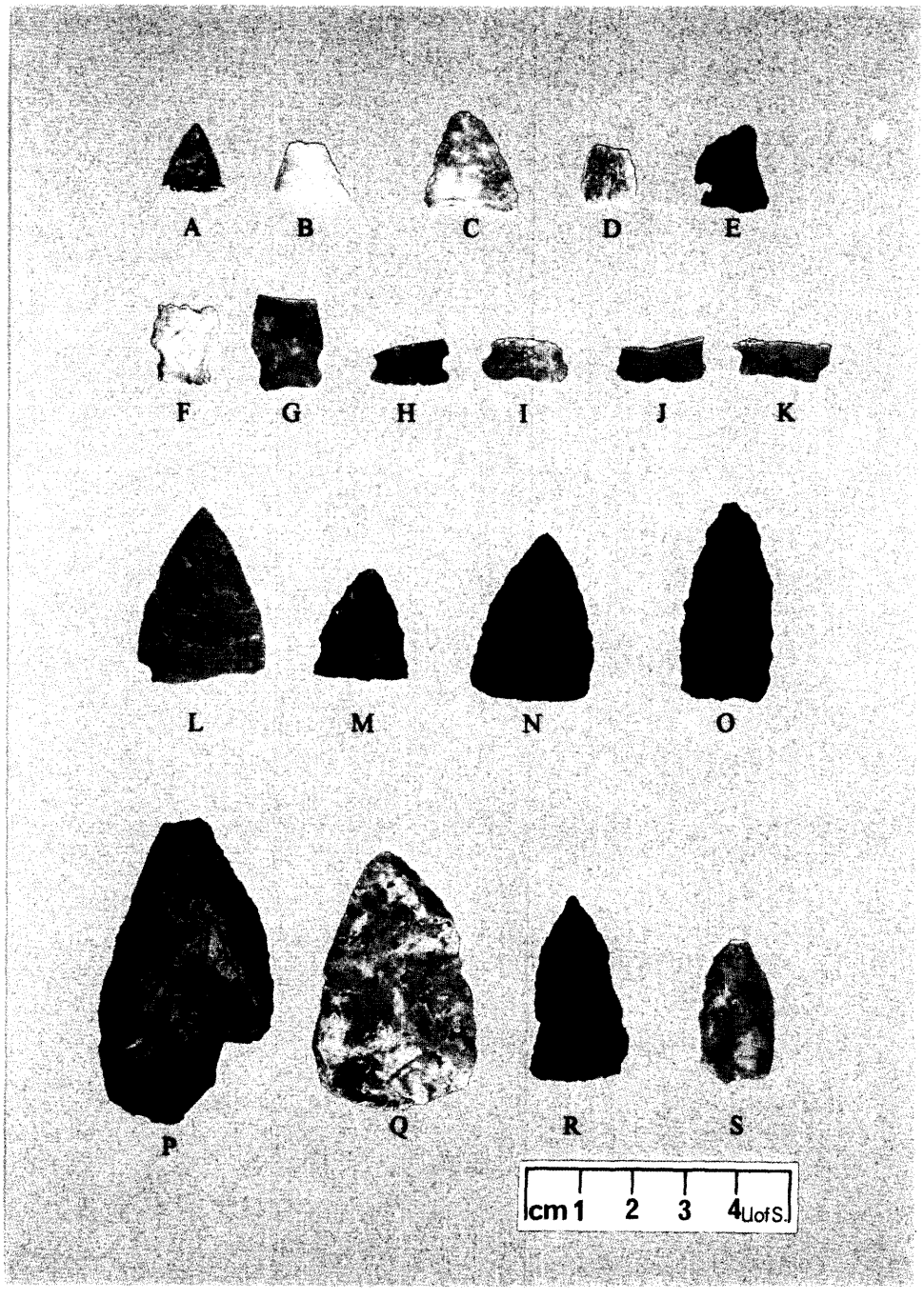


Figure B2

A - point fragment (5073), B - point fragment (5074), C - possible Late Period point (85), D - point fragment (5072), E - point fragment (442), F - point base (82), G - point fragment (83), H - possible Besant point (5063), I - point base (5064), J - point base (77), K - possible Besant point (5069), L - biface (84), M - biface (5079), N - biface (1479), O - biface (5075), P - biface (113), Q - preform (5090), R - preform (1502), S - preform (233).

Bifaces and Biface Fragments

Bifaces are characterized by the complete or near complete bifacial finishing of the tool, in addition to marginal flaking to sharpen tool edges. Functionally they are assumed to have served a number of purposes including, but not limited to cutting. Bifaces may display specialized hafting modifications.

Site EgNo 23

Cat.No. 84 biface body fragment, well finished, rounded triangular body, hafted, broken horizontally through stem, biconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B2-L

Cat.No. 86 biface body fragment, well finished, triangular body with elongate lateral edges, biconvex cross section, one surface more domed than other

Material Type : yellow quartzite

Provenience : surface collection

Permit # 99-19

Cat.No. 87 biface base fragment, well finished, asymmetric reworked base fragment, roughly rectangular in shape, broken horizontally through body, thin biconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 89 biface fragment, tip and body fragment, moderately finished, asymmetric, biconvex cross section

Material Type : brown chert

Provenience : surface collection

Permit # 99-19

Cat.No. 96 biface fragment, lateral fragment of biface or preform, well finished, too fragmentary to determine tool shape or cross section, broken through flaw in material

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 113 biface, incomplete (tip and base broken), moderately finished, tip unworked, lateral break along base of ovate shaped tool, biconvex cross section, degree of finishing hampered by low quality of material

Material Type : yellow silicified peat

Provenience : surface collection

Permit # 99-19

Figure B2-P

Cat.No. 198 biface body fragment, moderately finished, too fragmentary to define tool shape or cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 284 biface fragment, portion of base and body, moderately finished, both surfaces present on base however body shows just one surface, too fragmentary to define shape or cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 597 biface tip fragment, well finished, too fragmentary to identify function or shape

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 630 biface fragment, extreme end of tip, too fragmentary to identify shape or function

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 1471 biface body fragment, well finished, too fragmentary to identify shape or function, possibly tapering to stemmed base, biconvex cross section

Material Type : brown silicified wood

Provenience : Auger Test # 38

Permit # 00-31

Cat.No. 1479 biface, well finished, triangular shape, right lateral edge is slightly asymmetric due to flaw in material, base is slightly convex, biconvex cross section

Material Type : brown silicified wood

Provenience : 270N 183E Level 3

Main Block Occupation 2

Permit # 00-31

Figure B2-N

Cat.No. 1487 biface tip fragment, well finished, elongate with rounded distal end, too fragmentary to define shape or function of tool, fragment does suggest unusually narrow biface, asymmetric biconvex cross section

Material Type : mottled grey chert

Provenience : 265N 200E Level 9

Permit # 00-31

Cat.No. 1489 biface base fragment, well finished, thinned straight base, too fragmentary to define tool shape or function, most of one surface missing so unable to determine cross section

Material Type : heat treated brown silicified wood

Provenience : 259N 202E Level 8

Permit # 00-31

Cat.No. 5075 biface, well finished, complete, slightly asymmetric triangular shape with gently convex lateral edges, irregular though generally straight base, roughly sinuous lateral edges, biconvex cross section

Material Type : brown silicified wood

Provenience : Main Block 265.89N 185.64E Level 4 42 cm BD

Permit # 01-45

Figure B2-O

Cat.No. 5076 biface tip fragment, well finished, body shape appears to have been broad triangular shape, biconvex cross section

Material Type : Knife River flint

Provenience : Main Block 264N 194E Level 9

Permit # 01-45

Cat.No. 5077 biface tip fragment, one lateral edge well finished, other edge only moderately finished though may be reworked, tip is rounded, asymmetric triangular shape, asymmetric biconvex cross section, possibly proximal hafting end of scraper

Material Type : Swan River chert

Provenience : Main Block 264.73N 195.85E Level 6 78 cm BD

Permit # 01-45

Cat.No. 5078 biface tip fragment, well finished, asymmetric triangular shape, asymmetric biconvex cross section, possibly projectile point broken above shoulders

Material Type : brown silicified peat

Provenience : Main Block 264N 197E Level 8

Permit # 01-45

Cat.No. 5079 biface fragment, tip and body fragment, well finished, broken across body of tool along flaw in material, one lateral edge shows heavy use so tool didn't break during manufacture, triangular shaped body with convex edges, planoconvex cross section, possibly body of Besant point

Material Type : Montana chert

Provenience : Main Block 265N 186E Level 1
Main Block Occupation 2
Permit # 01-45
Figure B2-M

Cat.No. 5080 biface fragment, tip and body, moderately finished, extreme tip shows some damage, broad triangular shape, asymmetric biconvex cross section, possibly body of Besant point
Material Type : heavily patinated brown chert
Provenience : Main Block 265.10N 197.82E Level 9 104 cm BD
Permit # 01-45

Cat.No. 5081 biface fragment, moderately finished, lateral edge fragment from body of tool, too fragmentary to identify shape or function
Material Type : arenaceous chert
Provenience : Main Block 264N 183E Level 4
Permit # 01-45

Cat.No. 5082 biface fragment, moderately finished, lateral edge fragment from body of tool, too fragmentary to identify shape or function, possibly from preform, flaw in material has prevented complete finishing
Material Type : mixed grey chert
Provenience : Main Block 264N 183E Level 8
Main Block Cultural Level 4
Permit # 01-45

Cat.No. 5083 biface fragment, well finished, base fragment possibly from ovate shaped tool, too fragmentary to identify shape or function, biconvex cross section
Material Type : Swan River chert
Provenience : Main Block 264N 186E Level 8
Main Block Cultural Level 4
Permit # 01-45

Cat.No. 5084 biface fragment, well finished, too fragmentary to shape and function, possibly lateral edge of body

Material Type : mottled grey chert

Provenience : Main Block 265N 183E Level 8
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5085 biface fragment, well finished, too fragmentary to identify shape or function

Material Type : brown silicified wood

Provenience : Main Block 266.93N 183.26E Level 8 96 cm BD
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5086 biface fragment, moderately finished, too fragmentary to identify shape or function, possibly body fragment which refits with Cat.No. 5087

Material Type : heat damaged brown silicified peat

Provenience : Main Block 265N 184E Level 4

Permit # 01-45

Cat.No. 5087 biface fragment, moderately finished, too fragmentary to identify shape or function, possibly body fragment which refits with Cat.No. 5086

Material Type : heat damaged brown silicified peat

Provenience : Main Block 264N 184E Level 5

Permit # 01-45

Biface Measurements, Site EgNo 23

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
84	3.2*	2.4	0.7	4.9*
86	2.8*	1.9	0.7	3.1*
87	2.3*	2.1	0.5	2.7*
89	1.7*	1.6*	0.7*	1.5*
96	2.7*	1.4*	0.7*	2.0*
113	5.8	3.3	0.9	14.8*
198	1.8*	2.0*	0.9*	2.9*
284	3.0*	2.0*	0.6*	3.6*
597	0.9*	1.0*	0.3*	0.4*
630	0.7*	0.7*	0.3*	0.1*
1471	1.2*	1.6*	0.5*	1.0*
1479	3.2	2.3	0.6	4.1
1487	1.8*	1.3*	0.5*	1.1*
1489	1.9*	2.2*	0.6*	1.9*
5075	3.7	1.8	0.7	4.9
5076	1.6*	2.2*	0.4*	1.3*
5077	2.2*	1.6*	0.5*	1.6*
5078	2.0*	1.2*	0.4*	0.9*
5079	2.1*	1.8*	0.5*	1.5*
5080	1.9*	1.7*	0.4*	1.2*
5081	1.1*	2.1*	0.7*	1.4*
5082	2.4*	1.1*	0.5*	0.7*
5083	1.3*	2.1*	0.5*	1.2*
5084	1.2*	0.8*	0.5*	0.4*
5085	2.1*	0.8*	0.5*	0.6*
5086	2.8*	1.2*	0.4*	1.1*
5087	2.9*	1.6*	0.9*	3.4*

* indicates incomplete measurement, broken tool

Preforms and Preform Fragments

Preforms are bifacial tool blanks demonstrating varying levels of bifacial thinning and shaping. Preforms range from small pieces of raw material displaying minimal finishing (stage 1) to almost completely finished forms simply lacking hafting modifications (stage 5) (Keyser 1985).

Site EgNo 23

Cat.No. 233 preform, stage 4, initial stage bifacial shaping of an exhausted bipolar core, ovate shape, biconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B2-S

Cat.No. 970 preform fragment, stage 5, well finished, bifacial thinning and retouch along one lateral edge of broken flake, appears to have broken during manufacture, irregular shape, biconvex cross section to finished section of tool, possibly biface with unfinished

Material Type : brown silicified wood

Provenience : 267N 194E Level 7 NW quad

Permit # 00-31

Cat.No. 1486 preform fragment, stage 3, moderate bifacial flaking and shaping of entire form, both lateral edges and base, tip missing, asymmetric rectangular shape, biplano cross section

Material Type : brown silicified wood

Provenience : 265N 200E Level 7

Permit # 00-31

Cat.No. 1493 preform, stage 3, moderate degree of bifacial thinning and shaping on tool, bifacial retouch along lateral edges, unifacial retouch along distal end, proximal end is unworked, one edge appears more finished and possibly used as biface, asymmetric biconvex cross section

Material Type : Swan River chert

Provenience : surface collection Area 1
Permit # 00-31

Cat.No. 1494 preform fragment, stage 2, moderately degree of bifacial thinning and shaping of tool fragment, bifacial retouch along both edges, medial fragment shows unidentifiable shape and asymmetric biconvex cross section
Material Type : Swan River chert
Provenience : surface collection Area 1
Permit # 00-31

Cat.No. 1502 preform, stage 5, asymmetric triangular shape, well finished bifacial flake removal across both surface on distal half of tool, bifacial flake removal limited to lateral edges and base on proximal half of tool, degree of finishing limited by material, planoconvex cross section
Material Type : brown silicified wood
Provenience : surface collection Area 1
Permit # 00-31
Figure B2-R

Cat.No. 5088 preform fragment, stage 4, lateral fragment showing complete thinning / shaping adjacent to section showing no flaking, too fragmentary to identify shape or function
Material Type : mottled brown chalcedony
Provenience : Main Block 264N 183E Level 4
Permit # 01-45

Cat.No. 5089 preform fragment, stage 2, early stage preform, broken during manufacture and possibly used as expediency tool, bifacial flake removal off lateral edge with some shaping across one face
Material Type : basalt
Provenience : Main Block 264.93N 184.12E Level 5 62 cm BD
Permit # 01-45

Cat.No. 5090 preform, stage 3, complete bifacial shaping and thinning of tool, one edge shows steep angle minimal flaking due to flaw in material, triangular shape with slightly convex lateral edges, convex base, asymmetric biconvex cross section

Material Type : Swan River chert

Provenience : Main Block 264.35N 192.86E Level 7 87 cm BD

Permit # 01-45

Figure B2-Q

Cat.No. 5091 preform, stage 2, early stage, minimal bifacial flake removal off lateral edges only, large section of cortex remaining on one surface of cobble spall, irregular rectangular shape, planoconvex cross section

Material Type : mottled pink quartzite

Provenience : Main Block 264.69N 194.10E Level 6 78 cm BD

Permit # 01-45

Cat.No. 5092 preform fragment, stage 3, lateral edge of preform or biface, too fragmentary to identify shape or function

Material Type : brown silicified wood

Provenience : Main Block 265N 183E Level 4

Permit # 01-45

Cat.No. 5093 preform fragment, stage 2, early stage bifacial shaping across tool, possibly ovate shape, irregular biconvex cross section

Material Type : Swan River chert

Provenience : Main Block 265.25N 188.93E Level 9 108 cm BD
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5094 failed preform, early stage preform with failed flake removal off all edges, one lateral edge shows serrated unifacial retouch, one concave surface appears utilized, opposing surface shows bipolar flake removal, irregular shape, irregular cross section

Material Type : heat treated mottled yellow chert

Provenience : Main Block 265N 192E Level 8
Permit # 01-45

Cat.No. 5095 preform fragment, stage 2, proximal end of early stage preform, bifacial shaping of form at early stage, possibly rectangular shape, biconvex cross section
Material Type : Swan River chert
Provenience : Main Block 265.21N 195.89E Level 6 79 cm BD
Permit # 01-45

Cat.No. 5096 preform fragment, stage 3, proximal and lateral portion of tool, finely finished, appears to have been broken during final shaping process, proximal end is moderately worked due to presence of cortex or flaw in material, possible ovate shape, biconvex cross section
Material Type : patinated brown chert
Provenience : Main Block 265N 199E Level 9
Permit # 01-45

Cat.No. 5097 failed preform, stage 3, exhausted bipolar core showing early stage shaping, largely unifacial flaking giving preform a domed shape, irregular ovate shape, planoconvex cross section
Material Type : mixed pink quartz
Provenience : Main Block 267.18N 183.38E Level 8 97 cm BD
Main Block Cultural Level 4
Permit # 01-45

Cat.No. 5098 preform fragment, stage 5, lateral fragment showing fine bifacial shaping and thinning, edge doesn't show indication of use so tool possibly broken during final shaping, tool shape undetermined, biconvex cross section
Material Type : heat treated red silicified wood
Provenience : Block 2 243N 233E Level 1
Block 2 Component 1
Permit # 01-45

Cat.No. 5099 failed preform, exhausted bipolar core showing early stage shaping, largely unifacial flaking giving preform a domed shape, irregular shape, asymmetric planoconvex cross section, possibly scraper preform

Material Type : white quartz

Provenience : Block 2 243N 233E Level 1

Block 2 Component 1

Permit # 01-45

Preform Measurements, Site EgNo 23

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
233	2.6	1.4	0.7	2.6
970	2.8	2.3*	0.6	2.7*
1486	3.1*	2.4	0.9	8.0*
1493	7.1	5.1	1.7	64.9
1494	3.4*	4.9*	1.3*	30.7*
1502	3.5	1.8	0.5	3.4
5088	1.7*	3.4*	0.9*	4.3
5089	6.8*	4.1*	1.7*	53.8*
5090	4.9	3.1	0.9	14.8
5091	8.6	4.9	2.0	119.0
5092	3.9*	1.6*	0.6*	3.4*
5093	3.2*	4.1*	1.4*	18.7*
5094	2.0	2.5	0.8	4.2
5095	4.1*	4.3*	1.4*	23.0*
5096	4.1*	2.7*	0.6*	5.8*
5097	3.1	2.7	1.1	10.2
5098	3.6*	1.7*	1.1*	8.8*
5099	2.1	1.7	1.2	5.1

* indicates incomplete measurement, broken tool

Wedges and Wedge Fragments

Wedges are bifacially modified tools believed to have been used for splitting wood, antler, and bone. They may be highly modified forms to irregularly shaped, minimally finished tools. Diagnostic attributes include bipolar flaking, hinge fracturing, and crushing along both the proximal and distal ends due to the massive application of force. Wedges are also referred to as pieces esquillees.

Site EgNo 23

Cat.No. 117 wedge, exhausted bipolar core, heavy bifacial battering along distal end with corresponding battering on proximal end, one lateral edge shows bifacial retouch and minimal battering while opposite edge is broken (may also have been used as wedge), asymmetric rectangular shape, asymmetric cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 119 wedge, exhausted bipolar core, heavy bifacial battering along distal end with corresponding battering along either side of cortex-covered proximal platform, minimal battering along lateral edges (also used as wedge), asymmetric rectangular shape, irregular cross section

Material Type : mixed white quartzite

Provenience : surface collection

Permit # 99-19

Figure B3-D

Cat.No. 128 wedge, exhausted bipolar core, heavy bifacial battering along lateral edges, roughly rectangular shape, asymmetric biplano cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B3-A

Cat.No. 129 wedge fragment, exhausted bipolar core, heavy bifacial battering along proximal / distal ends and both lateral edges, asymmetric rectangular shape, irregular cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 1082 wedge fragment, one lateral edge broken, tool is well shaped, bifacial flaking to create relatively symmetric wedge widening towards distal end, heavy bifacial battering on proximal and distal ends, roughly triangular shape

Material Type : red chert

Provenience : 265N 200E Level 10

Main Block Cultural Level 4

Permit # 00-31

Cat.No. 1473 wedge fragment, distal end shows bifacial retouch, flake removal and battering of bipolar core fragment, limited battering along proximal end, roughly rectangular shape, irregular cross section

Material Type : Swan River chert

Provenience : Auger Test # 63

Permit # 00-31

Figure B3-C

Cat.No. 5118 wedge fragment, bifacial flake removal off one platform, opposing platform missing, tool fragment may be early stage preform or minimally used wedge, very little battering along edge, irregular shape, biconvex cross section

Material Type : Swan River chert

Provenience : Main Block 264N 183E Level 4

Permit # 01-45

Cat.No. 5119 wedge, unifacial battering along left lateral edge and bifacial battering along right lateral edge of primary decortication flake, minimal degree of use, irregular shape, asymmetric biconvex cross section

Material Type : mixed grey pebble chert

Provenience : Main Block 264N 194E Level 9
Permit # 01-45
Figure B3-G

Cat.No. 5120 wedge fragment, unifacial battering and retouch along portion of proximal end with small section of bifacial battering at left side, bifacial battering along distal end, minimally used wedge or crude preform fragment, roughly square shaped, irregular cross section
Material Type : Swan River chert
Provenience : Main Block 264N 195E Level 9
Permit # 01-45

Cat.No. 5121 wedge, bifacial battering along proximal and distal ends, heavy utilization, possibly exhausted bipolar core, roughly rectangular shape, roughly biconvex cross section
Material Type : mottled grey chert
Provenience : Main Block 264N 196E Level 6
Permit # 01-45
Figure B3-I

Cat.No. 5122 wedge, bifacial battering along proximal and distal ends, minimal use, reused exhausted bipolar core, roughly rectangular shape, irregular cross section
Material Type : Knife River flint
Provenience : Main Block 264N 197E Level 7
Permit # 01-45
Figure B3-H

Cat.No. 5123 wedge, unifacial battering along proximal end, bifacial battering along distal end, moderate level of use, roughly rectangular shape, asymmetric biconvex cross section
Material Type : Swan River chert
Provenience : Main Block 264N 197E Level 9
Permit # 01-45

Figure B3-E

Cat.No. 5124 wedge, unifacial battering along proximal end and bifacial battering along distal end, minimal use, roughly square shape, roughly biplano cross section

Material Type : Swan River chert

Provenience : Main Block 265N 192E Level 2

Main Block Occupation 2

Permit # 01-45

Figure B3-J

Cat.No. 5125 wedge, two refit fragments, heavy bifacial battering along proximal and distal ends, distal end has concave appearance but use wear is consistent with function as wedge as opposed to use as spokeshave, tool appears to have broken during use with material missing form both faces, roughly rectangular shape, irregular cross section

Material Type : mottled grey chert

Provenience : Main Block 265N 195E Level 6

Permit # 01-45

Figure B3-F

Cat.No. 5126 wedge fragment, distal end broken, heavy bifacial battering along proximal end and both lateral edges, appears to have been heavily used in both directions (proximal/distal and lateral/lateral), possibly rectangular shape, asymmetric planoconvex cross section

Material Type : heat treated Swan River chert

Provenience : Main Block 265N 195E Level 9

Permit # 01-45

Cat.No. 5127 wedge fragment, proximal end broken, heavy bifacial battering along distal end and both lateral edges, appears to have been heavily used in both directions (proximal/distal and lateral/lateral), possibly rectangular shape, roughly biconvex cross section

Material Type : white quartz

Provenience : Main Block 265N 198E Level 9

Permit # 01-45

Cat.No. 5128 wedge, heavy unifacial battering along both lateral edges of primary decortication flake, minimal use, heavy battering due to toughness of material not intensity of use, battering on ventral surface, irregular rectangular shape, asymmetric planoconvex cross section

Material Type : mixed grey quartz

Provenience : Block 2 242.97N 231.04E Level 4 50 cm BD

Block 2 Component 3

Permit # 01-45

Figure B3-B

Cat.No. 5129 wedge, bifacial battering along proximal and distal ends, minimal use, possibly exhausted core with minimal use as wedge, slightly asymmetric rectangular shape, irregular cross section

Material Type : Swan River chert

Provenience : Block 2 243.28N 233.20E Level 4 44 cm BD

Block 2 Component 3

Permit # 01-45

Figure B3-K

Cat.No. 5130 wedge fragment, lateral edge missing, unifacial battering along proximal end, bifacial battering along distal end and right lateral edge, possibly minimal use of exhausted core, possibly square shape, biplano cross section

Material Type : Swan River chert

Provenience : Block 2 243N 233E Level 4

Block 2 Component 3

Permit # 01-45

Wedge Measurements, Site EgNo 23

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
117	2.6	2.6*	0.9	6.1*
119	3.3	3.1	1.3	9.9
128	4.2	3.2	1.3	21.9
129	2.9	2.3*	0.8*	6.3*
1082	2.0	1.9*	0.9	3.1*
1473	3.0	2.4	1.7	12.9
5118	2.1*	1.6*	0.7*	2.3*
5119	2.2	1.9	0.8	3.2
5120	1.1	1.0	0.5	0.7
5121	1.3	1.6	0.4	0.8
5122	1.8	1.3	0.5	1.2
5123	2.2	2.6	0.8	5.1
5124	1.6	1.5	0.5	1.4
5125	1.6	2.7	0.7	2.7
5126	1.7*	1.6	0.6	1.8*
5127	1.3*	1.4	0.6	1.1*
5128	3.3	3.4	1.4	21.0
5129	1.8	1.6	0.7	1.8
5130	1.5	1.0*	0.4*	0.8*

* indicates incomplete measurement, broken tool

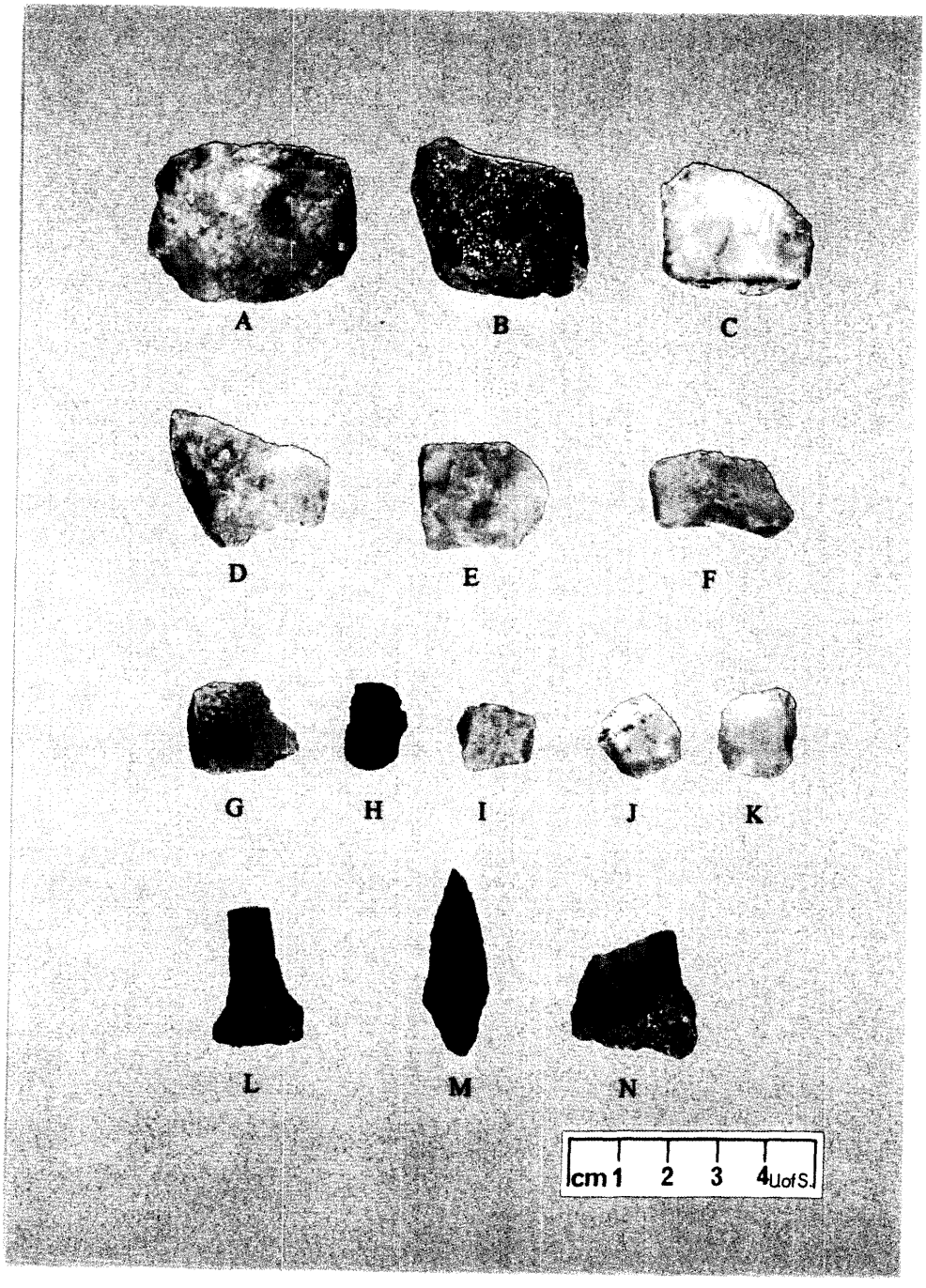


Figure B3

A - wedge (128), B - wedge (5128), C - wedge fragment (1473), D - wedge (119), E - wedge (5123), F - wedge (5125), G - wedge (5119), H - wedge (5122), I - wedge (5121), J - wedge (5124), K - wedge (5129), L - drill (5131), M - perforator (5132), N - perforator (5133).

Scrapers and Scraper Fragments

Scrapers are specialized unifacial tools displaying characteristic steep angle retouch along the working edge(s) of the tool. End and side scrapers exhibit retouch along the distal end of the tool plus patterned one or both lateral edges. Retouch is confined to the distal end of the tool on endscrapers while sidescrapers exhibit the working edge of the tool along the lateral edge of the form.

Site EgNo 23

Cat.No. 90 scraper fragment, proximal end of hafted scraper, well finished unifacial flaking along lateral edges and proximal end, planoconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 91 sidescraper, moderately finished domed scraper with primary working surface along left lateral edge near distal end, distal end marked by hinge fractures and crushing, unifacial retouch along both lateral edges and distal end, proximal end of right edge broken, roughly rectangular shape, asymmetric planoconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Figure B4-N

Cat.No. 92 endscraper, well finished unifacial flaking across dorsal surface, unifacial retouch along lateral edges and proximal end for hafting, rectangular shape with domed distal end, planoconvex cross section

Material Type : arenaceous chert

Provenience : surface collection

Permit # 99-19

Figure B4-J

Cat.No. 93 end and side scraper, well finished unifacial retouch limited to distal end and lateral edges, steep angle retouch along distal end and domed right

lateral edge, square shape, planoconvex cross section, dorsal surface retains pebble chert

Material Type : black pebble chert

Provenience : surface collection

Permit # 99-19

Figure B4-A

Cat.No. 94 scraper fragment, well finished unifacial retouch along one edge, steep angle retouch, possibly side scraper fragment, proximal and distal ends broken, one lateral edge missing, asymmetric planoconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 95 sidescraper fragment, well finished steep angle unifacial retouch along one lateral edge and one end of tool fragment, asymmetric planoconvex cross section

Material Type : yellow silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 97 end and side scraper, well finished steep angle unifacial retouch along distal end and right lateral edge, unifacial retouch along left lateral edge, asymmetric cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 98 end and side scraper fragment, well finished, steep angle unifacial retouch along distal end and left lateral edge, unifacial retouch along right lateral edge, asymmetric planoconvex cross section

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 112 reverse scraper, well finished patterned unifacial retouch along both lateral edges and distal end of primary decortication flake, relatively steep angle retouch, dorsal surface retains cortex, roughly rectangular shape, asymmetric distal end angles to point, biconvex cross section

Material Type : brown quartzite

Provenience : surface collection

Permit # 99-19

Cat.No. 358 scraper fragment, steep angle unifacial retouch along unbroken edge of tool, too fragmentary to determine shape or function

Material Type : mottled white chert

Provenience : surface collection

Permit # 99-19

Cat.No. 657 reverse scraper, minimally shaped and finished, moderately patterned steep angle unifacial retouch along distal end and one lateral edge of ventral surface of primary decortication flake, roughly ovate shape, domed asymmetric planoconvex cross section

Material Type : grey quartzite

Provenience : surface collection

Permit # 99-19

Cat.No. 1476 endscraper, well finished steep angle retouch along distal end, rest of dorsal surface retains weathered/polished cortex, roughly triangular shape, asymmetric planoconvex cross section, tool retains shape of flake

Material Type : Knife River flint

Provenience : 267.15N 194.28E Level 7

Permit # 00-31

Figure B4-F

Cat.No. 1481 scraper fragment, well finished steep angle unifacial retouch along both lateral edges, slight battering on proximal end from hafting, distal end is missing, dorsal surface shows minimal shaping, planoconvex cross section

Material Type : Knife River flint

Provenience : Main Block 270N 183E Level 4
Main Block Occupation 2
Permit # 00-31

Cat.No. 1492 endscraper, asymmetric thumbnail scraper, well finished steep angle unifacial retouch along distal end, unifacial retouch along lateral edges possibly for hafting, minimal finishing of dorsal surface, asymmetric triangular shape, asymmetric planoconvex cross section
Material Type : mixed black chert
Provenience : 140N 110E Level 4
Permit # 00-31
Figure B4-G

Cat.No. 5100 scraper fragment, proximal hafting portion of scraper, distal end missing, left lateral edge shows steep angle unifacial retouch, right lateral edge shows low angle unifacial retouch, portion of dorsal surface missing so cross section indeterminate, shape indeterminate
Material Type : grey chalcedony
Provenience : Main Block 264N 183E Level 8
Main Block Cultural Level 4
Permit # 01-45

Cat.No. 5101 scraper fragment, distal end of scraper with proximal end missing, steep angle unifacial retouch along distal end and left lateral edge, right lateral edge unworked, asymmetric minimally shaped dorsal surface, indeterminate shape, asymmetric planoconvex cross section
Material Type : mixed yellow chert
Provenience : Main Block 264N 184E Level 9
Main Block Cultural Level 4
Permit # 01-45

Cat.No. 5102 endscraper, steep angle unifacial retouch along distal end, unifacial shaping of lateral edges with minimal retouch along edges near proximal end

possibly for hafting, hinge fracture extending from proximal end may be damage from hafting, asymmetric triangular shape, triangular cross section

Material Type : Knife River flint

Provenience : Main Block 264N 185E Level 8

Main Block Cultural Level 4

Permit # 01-45

Figure B4-I

Cat.No. 5103 endscraper, steep angle retouch along distal end and distal section of right lateral edge, distal portion also shows heavy crushing/use, minimal unifacial shaping of lateral edges and hinge fractures from proximal end may indicate hafting, portion of dorsal surface retains cortex, roughly rectangular shape, asymmetric planoconvex cross section

Material Type : brown silicified wood

Provenience : Main Block 264N 186E Level 2

Main Block Occupation 1

Permit # 01-45

Figure B4-M

Cat.No. 5104 sidescraper, moderately steep unifacial retouch along left lateral edge, left edge is major working edge, unifacial retouch along distal end and right lateral edge, roughly square shape, asymmetric planoconvex cross section, moderate shaping of dorsal surface

Material Type : Knife River flint

Provenience : Main Block 264N 193E Level 2

Main Block Occupation 1

Permit # 01-45

Figure B4-Q

Cat.No. 5105 sidescraper, steep angle unifacial retouch along right lateral edge, right edge is major working edge, unifacial retouch along distal and left lateral edge, moderate shaping of dorsal surface, asymmetric square shape, asymmetric biconvex cross section at proximal end and planoconvex cross section at distal end

Material Type : grey chert with inclusions
Provenience : Main Block 264N 194E Level 7
Permit # 01-45
Figure B4-O

Cat.No. 5106 endscraper, steep angle unifacial retouch along distal end, unifacial retouch and battering along both lateral edges and proximal end which is evidence of hafting, complete finishing of dorsal surface, roughly rectangular shape, triangular cross section
Material Type : banded grey chert
Provenience : Main Block 265.89N 183.70E Level 8 98 cm BD
Main Block Cultural Level 4
Permit # 01-45
Figure B4-K

Cat.No. 5107 and 5108 end and side scraper, two refit fragments, tool broken across middle of tool, steep angle unifacial retouch along distal end and both lateral edges, irregular unifacial retouch and battering along proximal end (possibly from flake preparation/use), dorsal surface smooth but unworked, rectangular shape, biplano cross section
Material Type : mottled grey chert (Cat.No. 5107 has weathered to a darker grey)
Provenience : Main Block 265N 184E Level 6 (Cat.No. 5107)
265N 185E Level 6
Permit # 01-45
Figure B4-D

Cat.No. 5109 endscraper, steep angle unifacial retouch along distal end, marginal unifacial retouch and battering along both lateral edges from hafting, dorsal surface shows shaping, ventral surface shows irregular face with some shaping, roughly rectangular shape, asymmetric triangular cross section
Material Type : brown silicified wood
Provenience : 265N 184E Level 8
Main Block Cultural Level 4
Permit # 01-45

Figure B4-L

Cat.No. 5110 end and side scraper, steep angle unifacial retouch along distal end and both lateral edges, distal end and right edge appear to be primary working edges, dorsal surface thinned by single flake removal, retouch of edges produces asymmetric planoconvex cross section, roughly rectangular shape

Material Type : mixed yellow silicified wood

Provenience : Main Block 265N 191E Level 9
Main Block Cultural Level 4

Permit # 01-45

Figure B4-B

Cat.No. 5111 scraper fragment, proximal end of scraper, right lateral edge shows steep angle unifacial retouch so possibly end and side scraper fragment, unifacial retouch along left lateral end, possibly triangular shape, planoconvex cross section

Material Type : Knife River flint

Provenience : Main Block 265N 192E Level 1
Main Block Occupation 1

Permit # 01-45

Cat.No. 5112 sidescraper, steep angle unifacial retouch along both lateral edges, both edges are primary working edges, unifacial retouch along portion of distal end, dorsal surface moderately worked, hinge fracture extending from proximal end, roughly rectangular shape, asymmetric planoconvex cross section

Material Type : Knife River flint

Provenience : Main Block 265.35N 194.71E Level 6 71 cm BD

Permit # 01-45

Figure B4-P

Cat.No. 5113 endscraper, steep angle unifacial retouch along distal end and extreme distal ends of lateral edges, unifacial battering along rest of right lateral edge, minimal finishing of dorsal surface due to flaw in material, triangular shape, triangular cross section

Material Type : brown chalcedony with inclusion
Provenience : Main Block 265N 194E Level 8
Permit # 01-45
Figure B4-H

Cat.No. 5114 endscraper fragment, portion of proximal end broken, steep angle unifacial retouch along distal end, marginal unifacial retouch along lateral edges, moderate finishing of dorsal surface, possibly triangular shape, asymmetric planoconvex cross section
Material Type : mottled white chert
Provenience : Main Block 265N 194E Level 9
Permit # 01-45

Cat.No. 5115 end and side scraper, steep angle unifacial retouch along distal end and both lateral edges, battering along distal end, dorsal surface well finished, triangular shape, asymmetric planoconvex cross section
Material Type : brown silicified peat
Provenience : Main Block 265N 195E Level 9
Permit # 01-45
Figure B4-C

Cat.No. 5116 end and side scraper, steep angle unifacial retouch along distal end and both lateral edges, dorsal surface retains section of cortex but shows steep angle retouch, ventral surface shows moderate flaking to thin proximal end for hafting, roughly rectangular shape, asymmetric planoconvex cross section
Material Type : mixed white chert
Provenience : Main Block 265N 196E Level 8
Permit # 01-45
Figure B4-E

Cat.No. 5117 large scraping tool, steep angle unifacial retouch along distal end and both lateral edges of cobble spall, moderate finishing of dorsal surface, triangular shape, planoconvex cross section
Material Type : banded purple quartzite

Provenience : Main Block 266.73N 183.14E Level 8 96 cm BD

Main Block Cultural Level 4

Permit # 01-45

Scraper Measurements, Site EgNo 23

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
90	1.8*	2.3*	0.7*	2.6*
91	2.4	1.9	0.8	3.4
92	2.8	1.8	0.7	3.9
93	1.6	1.5	0.4	1.2
94	1.8*	1.5*	0.7*	2.6*
95	1.5*	1.1*	0.4*	0.7*
97	1.8*	1.5	0.5	1.6*
98	1.3*	1.5	0.5	1.2*
112	6.7	4.6	1.3	44.2
358	1.8*	0.8*	0.3*	0.4*
657	4.4	3.4	1.6	23.9
1476	2.0	1.7	0.4	1.7
1481	1.9*	1.8*	0.3*	1.3*
1492	1.4	1.6	0.6	1.2
5100	1.5*	1.7*	0.4*	1.1*
5101	1.6*	2.4*	0.7*	3.1*
5102	1.6	1.2	0.6	1.0
5103	2.5	2.2	0.9	5.7
5104	1.3	1.2	0.3	0.4
5105	1.4	1.5	0.5	1.4
5106	2.4	1.6	1.0	4.1
5107/5108	2.6	1.8	0.3	2.3
5109	2.0	1.7	0.9	3.5
5110	1.6	1.4	0.4	0.9
5111	1.7*	1.1*	0.4*	0.7*
5112	1.7	1.2	0.4	0.8
5113	1.8	1.4	0.7	1.5
5114	1.7*	1.9	0.6	2.0*
5115	2.9	1.8	0.7	3.4
5116	3.2	1.9	0.7	4.9
5117	7.7	6.2	2.2	120.6

* indicates incomplete measurement, broken tool

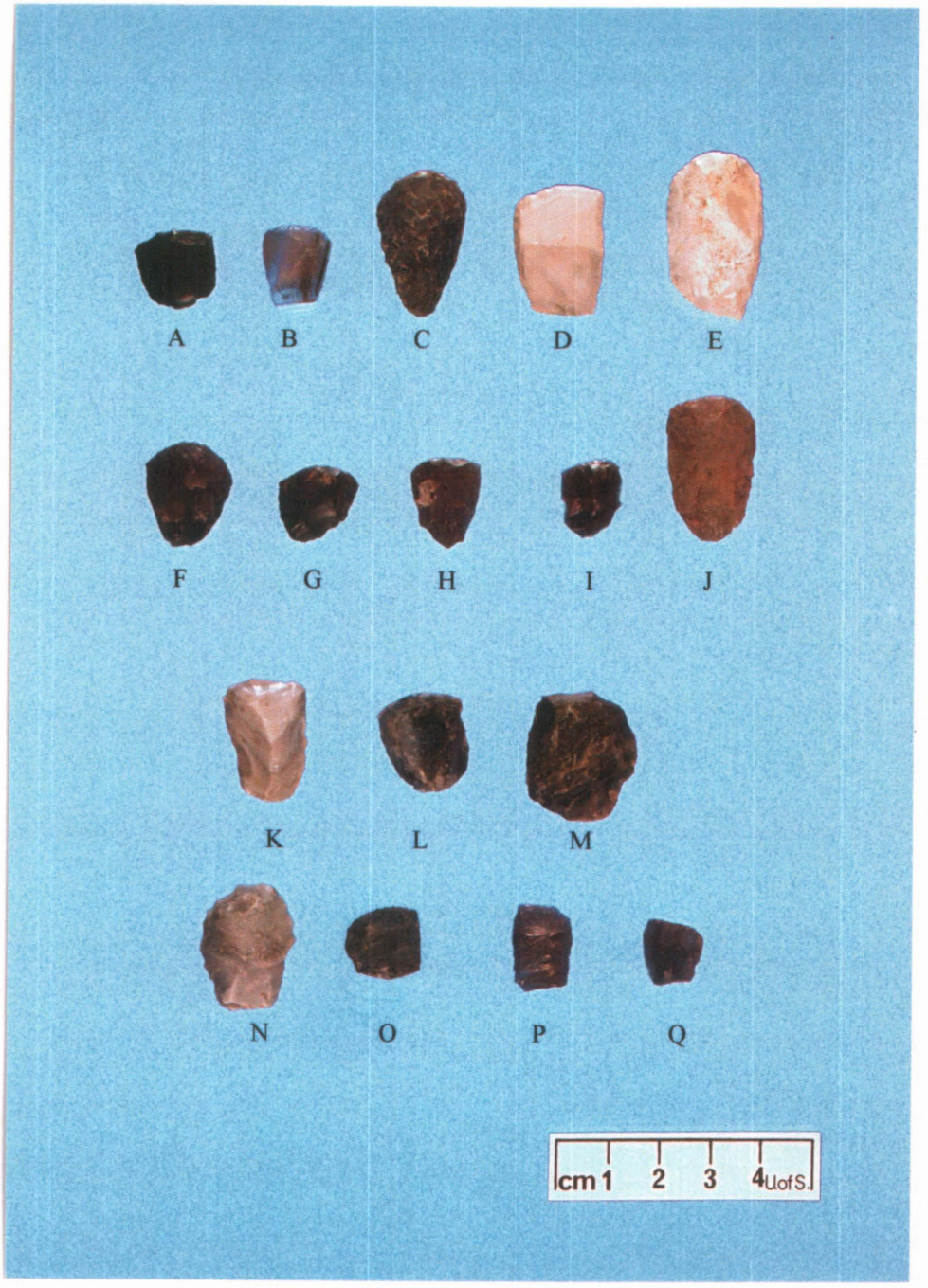


Figure B4

A - end/side scraper (93), B - end/side scraper (5110), C - end/side scraper (5115), D - end/side scraper (5107/5108), E - end/side scraper (5116), F - endscraper (1476), G - endscraper (1492), H - endscraper (5113), I - endscraper (5102), J - endscraper (92), K - endscraper (5106), L - endscraper (5109), M - endscraper (5103), N - sidescraper (91), O - sidescraper (5105), P - sidescraper (5112), Q - sidescraper (5104).

Unifaces and Uniface Fragments

Unifaces are characterized by the complete or near complete unifacial modification to the form. Unifacial flaking does not exhibit the steep angle of retouch displayed on scraping tools however are assumed to have functioned as scrapers or cutting tools.

Site EgNo 23

Cat.No. 1472 uniface fragment, well finished unifacial retouch along lateral edge, retouch confined to edge and is steeply angle, possibly sidescraper fragment, biplano cross section

Material Type : mottled grey chert

Provenience : Auger Test # 49

Permit # 00-31

Cat.No. 5136 uniface fragment, steep angle unifacial retouch along one edge of tool fragment, tool appears to have broken due to bipolar force, possibly scraper fragment used as wedge (shows bifacial fracture), too fragmentary to determine shape and function

Material Type : Knife River flint

Provenience : Main Block 264N 197E Level 6

Permit # 01-45

Cat.No.5137 uniface, well patterned unifacial retouch and thinning along right lateral edge, angle of retouch too low to serve as sidescraper, marginal unifacial retouch and battering along sections of left lateral edge, roughly rectangular shape, asymmetric biconvex cross section

Material Type : Knife River flint

Provenience : Main Block 264N 189E Level 5

Permit # 01-45

Figure B5-C

Cat.No. 5141 uniface fragment, well patterned unifacial along one edge of tool fragment, too fragmentary to determine shape or function

Material Type : red silicified wood

Provenience : Block 2 242N 232E Level 2

Block 2 Component 1

Permit # 01-45

Cat.No. 5142 uniface / multipurpose tool, well patterned unifacial retouch along three edges of flake fragment (fourth edge broken), left lateral edge shows steep angle retouch indicating use as scraper, left lateral edge and distal end meet at point that may have served as perforator, distal end may also have served as scraper, right lateral edge shows concave retouched surface that may have served as spokeshave, roughly square shape, biplano cross section

Material Type : Knife River flint

Provenience : Main Block 265N 196E Level 5

Main Block Occupation 2

Permit # 01-45

Figure B5-D

Cat.No. 5209 uniface / multipurpose tool, well patterned unifacial retouch along distal end of flake on dorsal surface (relatively steep angle so possible use as scraper), left lateral edge shows well patterned unifacial retouch on ventral surface which is more concave than steep, roughly square shape, irregular cross section

Material Type : brown silicified peat

Provenience : Main Block 264N 187E Level 8

Main Block Cultural Level 4

Permit # 01-45

Figure B5-E

Uniface Measurements, Site EgNo 23

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
1472	1.4*	2.6*	0.4	1.3*
5136	1.3*	1.7*	0.4*	0.8*
5137	1.8	1.5	0.7	1.7
5141	1.1*	1.0*	0.3*	0.3*
5142	2.0*	1.9	0.3	1.4*
5209	2.0	2.0	0.4	2.0

* indicates incomplete measurement, broken tool

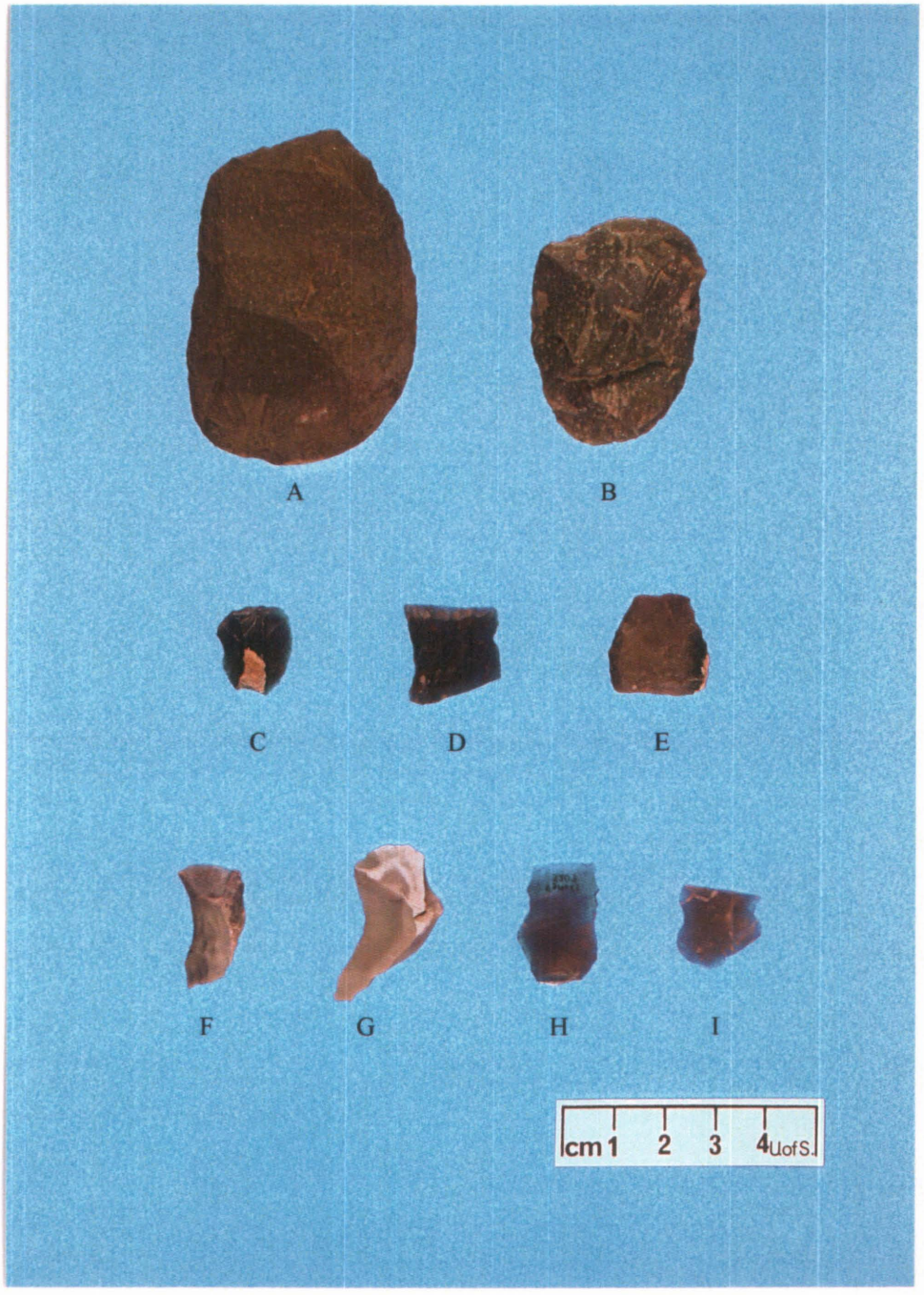


Figure B5

A - reverse scraper (112), B - reverse scraper (657), C - uniface (5137), D - uniface/multipurpose tool (5142), E - uniface/multipurpose (5209), F - spokeshave (5134), G - spokeshave (5208), H - spokeshave (5207), I - spokeshave (5135).

Drills

Drills are well finished, bifacially worked tools used for perforating and engraving.

Site EgNo 23

Cat.No. 5131 drill, rounded T-butt, distal end missing, well finished bifacial flaking across entire tool, slightly asymmetric T shape, biconvex cross section

Material Type : brown silicified peat

Provenience : Main Block 264N 184E Level 9
Main Block Cultural Level 4

Measurements : length - 2.8 cm, width at base - 1.8 cm, width of blade - 1.0 cm, thickness - 0.6 cm, weight - 2.5 gm

Permit # 01-45

Figure B3-L

Perforators

Perforators are the unifacial equivalent of drills and exhibit unifacial modification to the perforating bit.

Site EgNo 23

Cat.No. 5132 perforator, well patterned unifacial retouch along distal end of secondary flake, dorsal surface unworked (except at perforating end), ventral surface shows curve of flake, roughly ovate in shape, asymmetric triangular cross section

Material Type : Montana chert

Provenience : Main Block 264.70N 196.59E Level 8 92 cm BD

Measurements : length - 3.8 cm, length of working edge - 1.2 cm, width - 1.3 cm, thickness ; 0.7 cm, weight - 2.5 gm

Permit # 01-45

Figure B3-M

Cat.No. 5133 perforator, well patterned unifacial retouch has created a perforating edge on lateral edge of secondary flake, rest of dorsal surface unworked,

ventral surface shows compression ripples and is unworked, irregular shape, irregular cross section

Material Type : heat treated Swan River chert

Provenience : Main Block 264.54N 197.35E Level 9 106 cm BD

Measurements : length - 2.5 cm, length of working edge - 1.5 cm, width - 2.6 cm, thickness - 0.6 cm, weight - 3.1 gm

Permit # 01-45

Figure B3-N

Spokeshaves

Spokeshaves are tools on which the concave working surface is purposefully formed through patterned retouch and sharpening.

Site EgNo 23

Cat.No. 5134 spokeshave, well patterned unifacial retouch and heavy utilization along concave edge of flake fragment, retouch and use has produced steep angle to working surface, rest of flake fragment is unworked, irregular shape, planoconvex cross section

Material Type : mottled grey chert

Provenience : Main Block 264N 196E Level 8

Measurements : length - 2.4 cm, length of working edge - 1.6 cm, width - 1.4 cm, thickness - 0.7 cm, weight - 1.9 gm

Permit # 01-45

Figure B5-F

Cat.No. 5135 spokeshave, well patterned unifacial retouch along margin of concave edge of flake fragment, minimal use, retouch limited to concave edge, irregular shape, thin biconvex cross section

Material Type : Knife River flint

Provenience : Main Block 264N 197E Level 2
Main Block Occupation 2

Measurements : length - 1.6 cm, length of working edge - 0.9 cm, width - 1.7 cm, thickness - 0.2 cm, weight - 0.6 gm

Permit # 01-45

Figure B5-I

Cat.No. 5207 spokeshave, well patterned unifacial retouch along concave edge of flake, minimal unifacial utilization along proximal end of same lateral edge, opposite lateral edge shows small section of well patterned unifacial retouch on distal end, irregular shape, irregular cross section

Material Type : Knife River flint

Provenience : Main Block 264N 189E Level 9

Main Block Cultural Level 4

Measurements : length - 2.4 cm, width - 1.6 cm, thickness ; 0.3 cm, weight - 0.9 gm

Permit # 01-45

Figure B5-H

Cat.No. 5208 spokeshave, well patterned unifacial retouch along concave edge of flake, retouch limited to concave edge, irregular shape, irregular cross section

Material Type : mixed grey chert

Provenience : Main Block 264N 197E Level 9

Measurements : length - 2.1 cm, length of working edge - 1.3 cm, thickness - 0.7 cm, weight - 2.9 gm

Permit # 01-45

Figure B5-G

Hammerstones

Hammerstones are cobbles and pebbles with pitted ends commonly assumed to have been used at various stages of stone tool manufacture and for butchering activities.

Site EgNo 23

Cat.No. 1483 hammerstone, elongate cobble with heavy battering along distal end, battering has resulted in minimal flake / cortex removal, proximal end shows failed flake removal (possible attempted use as unidirectional core), truncated ovate shape, biconvex cross section

Material Type : mixed grey quartzite

Provenience : 270.98N 183.60E Level 5

Measurements : length - 11.4 cm, width - 8.7 cm, thickness - 7.6 cm, weight - 1073.8 gm

Permit # 00-31

Cat.No. 5138 hammerstone, small area of battering on proximal and distal ends of unmodified pebble, asymmetric ovate shape, asymmetric biconvex cross section

Material Type : mottled yellow quartzite

Provenience : Main Block 265.63N 192.48E Level 7 88 cm BD

Measurements : length - 4.9 cm, width - 2.5 cm, thickness - 2.0 cm, weight - 36.0 gm

Permit # 01-45

Expediency Tools

Expediency tools are characterized by finishing and sharpening confined to the margins of the tool. Retouched flakes exhibit patterned unifacial or bifacial flaking along portions of one or more margins of the tool. Utilized flakes exhibit flake removal due to the utilization of the natural sharpness of the flake.

Site EgNo 23

Cat.No. 101 retouched primary decortication flake, unifacial flake removal and patterned unifacial retouch along distal end and one lateral edge on dorsal surface

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 111 utilized split pebble, unpatterned unifacial flake removal along one lateral edge

Material Type : black pebble chert

Provenience : surface collection

Permit # 99-19

Cat.No. 114 retouched flake fragment, well patterned unifacial retouch along one lateral edge

Material Type : brown silicified wood

Provenience : surface collection

Permit # 99-19

Cat.No. 115 retouched flake fragment, well patterned bifacial retouch along one lateral edge, too fragmentary to define but may be biface fragment

Material Type : Montana chert

Provenience : surface collection

Permit # 99-19

Cat.No. 118 retouched flake fragment, patterned unifacial retouch along one lateral edge, portion of edge missing due to recent fracture

Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 124 utilized secondary flake, irregular unifacial flake removal along both lateral edges
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 181 retouched primary decortication flake fragment, patterned unifacial retouch along one lateral edge, opposite lateral edge shows use-wear / irregular unifacial flake removal, retouch and use on dorsal surface
Material Type : brown silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 192 retouched bipolar flake, alternating unifacial retouch along one lateral edge, patterned unifacial retouch along proximal end of flake on ventral surface, irregular unifacial flake removal along distal end of flake on dorsal surface
Material Type : Cathead chert
Provenience : surface collection
Permit # 99-19

Cat.No. 195 retouched flake fragment, patterned unifacial retouch along one lateral edge on dorsal surface
Material Type : white massive quartzite
Provenience : surface collection
Permit # 99-19

Cat.No. 209 utilized flake fragment, moderately patterned unifacial flake removal along section of one lateral edge
Material Type : Swan River chert
Provenience : surface collection

Permit # 99-19

Cat.No. 221 retouched platform rejuvenation flake fragment, small section of patterned unifacial retouch along one lateral edge
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 240 retouched secondary flake fragment, patterned unifacial retouch along one lateral edge with limited bifacial flake removal off same edge due to use
Material Type : heat treated brown silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 274 retouched secondary decortication flake, patterned unifacial retouch along distal end and right lateral edge on dorsal surface
Material Type : mixed white quartzite
Provenience : surface collection
Permit # 99-19

Cat.No. 301 utilized silicified wood nodule, irregular unifacial flake removal off one lateral edge
Material Type : brown silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 304 retouched flake fragment, minimal patterned bifacial retouch and battering along one edge
Material Type : brown silicified wood
Provenience : surface collection
Permit # 99-19

Cat.No. 306 utilized secondary decortication flake fragment, irregular unifacial flake removal off section of one lateral edge

Material Type : brown silicified siltstone
Provenience : surface collection
Permit # 99-19

Cat.No. 310 utilized shatter, bipolar crushing along distal and proximal ends, piece too small to be core
Material Type : Swan River chert
Provenience : surface collection
Permit # 99-19

Cat.No. 327 retouched flake fragment, minimal bifacial retouch along one lateral edge
Material Type : mottled white chert
Provenience : surface collection
Permit # 99-19

Cat.No. 329 retouched flake fragment, minimal bifacial retouch along one lateral edge
Material Type : mixed white chalcedony
Provenience : surface collection
Permit # 99-19

Cat.No. 332 retouched flake fragment, minimal bifacial retouch along portion of one lateral edge
Material Type : mixed yellow chert
Provenience : surface collection
Permit # 99-19

Cat.No. 340 utilized secondary flake, irregular unifacial flake removal distal end of flake
Material Type : feldspathic siltstone
Provenience : surface collection
Permit # 99-19

Cat.No. 342 retouched finishing flake, patterned unifacial retouch along both lateral edges

Material Type : mixed white chert

Provenience : surface collection

Permit # 99-19

Cat.No. 393 retouched flake fragment, minimal bifacial retouch along both lateral edges

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 655 retouched cobble spall, patterned unifacial along lateral edge and curved distal end of cobble spall, retouch on dorsal surface

Material Type : purple quartzite

Provenience : surface collection

Permit # 99-19

Cat.No. 656 retouched secondary decortication flake, minimally patterned unifacial retouch along section of curved distal end on dorsal surface, alternating minimally patterned unifacial retouch along portion of right lateral edge on ventral surface

Material Type : brown quartzite

Provenience : surface collection

Permit # 99-19

Cat.No. 660 retouched bipolar core, patterned bifacial retouch and heavy battering along one lateral edge of exhausted bipolar core

Material Type : Swan River chert

Provenience : surface collection

Permit # 99-19

Cat.No. 673 retouched shatter, minimal bifacial flake removal along one edge of tabular fragment of granitic cobble, flake removal has produced crude chopper

Material Type : miscellaneous coarse grained material
Provenience : Auger Test # 35
Permit # 00-31

Cat.No. 692 retouched secondary flake, minimally patterned unifacial retouch along naturally concave left lateral edge on dorsal surface
Material Type : Cathead chert
Provenience : Auger Test # 58
Permit # 00-31

Cat.No. 1084 retouched bipolar flake, moderately patterned unifacial retouch along section of one lateral edge
Material Type : Swan River chert
Provenience : 140N 110E Level 5
Permit # 00-31

Cat.No. 1094 utilized flake fragment, unpatterned bifacial flake removal along left lateral edge and unpatterned unifacial flake removal off right lateral edge
Material Type : Knife River flint
Provenience : 267N 194E Level 8
Main Block Cultural Level 4
Permit # 00-31

Cat.No. 1103 retouched flake fragment, patterned unifacial retouch along one lateral edge, tool broken so only small section remaining
Material Type : mottled grey chert
Provenience : 270N 183E Level 5
Main Block Occupation 2
Permit # 00-31

Cat.No. 1172 retouched primary decortication flake, well patterned unifacial retouch along left lateral edge on dorsal surface, unifacial flake removal off section of right lateral edge on ventral surface (from use), poorly patterned unifacial

retouch along concave section of right lateral edge near distal end on dorsal surface

Material Type : yellow pebble chert

Provenience : 277N 179E Level 7

Permit # 00-31

Cat.No. 1189 retouched flake fragment, moderately patterned unifacial retouch along one lateral edge of flake fragment

Material Type : brown silicified wood

Provenience : 170N 110E Level 3

Permit # 00-31

Cat.No. 1289 retouched flake fragment, well finished unifacial retouch along one edge of broken flake

Material Type : Swan River chert

Provenience : 170N 110E Level 5

Permit # 00-31

Cat.No. 1374 utilized flake fragment, poorly patterned bifacial flake removal off one section of flake edge

Material Type : brown chalcedony

Provenience : 140N 110E Level 3

Permit # 00-31

Cat.No. 1410 utilized secondary decortication flake fragment, unpatterned unifacial flake removal off one lateral edge

Material Type : yellow pebble chert

Provenience : surface collection Area 1

Permit # 00-31

Cat.No. 1429 retouched flake fragment, right lateral edge shows small section of well patterned unifacial retouch on dorsal surface, rest of edge shows irregular unifacial flake removal, left lateral edge shows irregular unifacial flake removal on dorsal surface

Material Type : white chert
Provenience : surface collection Area 1
Permit # 00-31

Cat.No. 1443 retouched bipolar flake, poorly patterned unifacial retouch along distal end and section of left lateral edge near proximal end on dorsal surface
Material Type : yellow quartzite
Provenience : surface collection Area 2
Permit # 00-31

Cat.No. 1475 retouched flake fragment, patterned retouch along both lateral edges but heat damage has removed portions of dorsal surface so it is no longer clear if retouch is unifacial or bifacial
Material Type : heat damaged red chert
Provenience : 267.04N 194.48E Level 7
Permit # 00-31

Cat.No. 1477 retouched flake fragment, moderately patterned unifacial retouch along one lateral edge
Material Type : mixed white chert
Provenience : 267N 194E Level 6 SE Quad
Permit # 00-31

Cat.No. 1478 retouched flake fragment, moderately patterned unifacial retouch along distal end of flake fragment, possible use as graver
Material Type : brown silicified wood
Provenience : 267N 194E Level 7 NW Quad
Permit # 00-31

Cat.No. 1484 retouched flake fragment, moderately patterned unifacial retouch along one lateral edge
Material Type : red chert
Provenience : 265N 200E Level 5
Main Block Occupation 2

Permit # 00-31

Cat.No. 1488 retouched primary decortication flake fragment, well patterned unifacial retouch along one lateral edge, flake edge is slightly convex
Material Type : Swan River chert
Provenience : 265N 200 Level 10
Main Block Cultural Level 4
Permit # 00-31

Cat.No. 1495 retouched platform rejuvenation flake, patterned unifacial retouch along distal end on dorsal surface, patterned bifacial retouch along both lateral edges
Material Type : Swan River chert
Provenience : surface collection Area 1
Permit # 00-31

Cat.No. 1498 retouched primary decortication flake, patterned unifacial retouch along left lateral edge, steep angle retouch so may have been used as scraper
Material Type : mixed black pebble chert
Provenience : surface collection Area 1
Permit # 00-31

Cat.No. 1503 retouched flake fragment, patterned steep angle unifacial retouch along section of one edge, same edge shows unifacial retouch and crushing along concave section of edge, irregular unifacial flake removal off second edge
Material Type : Knife River flint
Provenience : surface collection Area 1
Permit # 00-31

Cat.No. 1504 retouched flake fragment, patterned unifacial retouch along left lateral edge on dorsal surface, irregular unifacial flake removal and bifacial crushing along right lateral edge on ventral surface
Material Type : mottled grey chert
Provenience : surface collection Area 1
Permit # 00-31

Cat.No. 1505 utilized flake fragment, irregularly patterned unifacial flake removal off both lateral edges, platform of flake fragment shows bifacial battering

Material Type : mottled white chert

Provenience : 267N 194E Level 7

Permit # 00-31

Cat.No. 5143 retouched flake fragment, moderately patterned alternating bifacial and unifacial retouch along one edge

Material Type : brown silicified wood

Provenience : Main Block 264N 183E Level 4

Permit # 01-45

Cat.No. 5144 utilized flake fragment, unifacial flake removal off one edge

Material Type : black silicified siltstone

Provenience : Main Block 264.35N 184.75E Level 3

Main Block Occupation 2

Permit # 01-45

Cat.No. 5145 retouched flake, poorly patterned bifacial retouch along one edge, poorly patterned unifacial retouch along portion of one edge

Material Type : Swan River chert

Provenience : Main Block 264N 184E Level 3

Main Block Occupation 2

Permit # 01-45

Cat.No. 5146 utilized flake fragment, unifacial flake removal along one edge

Material Type : mottled grey quartzite

Provenience : Main Block 264N 184E Level 3

Main Block Occupation 2

Permit # 01-45

Cat.No. 5147 retouched flake fragment, well patterned unifacial retouch along one edge

Material Type : brown silicified wood

Provenience : Main Block 264N 184E Level 3
Main Block Occupation 2
Permit # 01-45

Cat.No. 5148 retouched flake fragment, minimally patterned unifacial retouch along two edges
Material Type : mottled grey quartzite
Provenience : Main Block 264.07N 184.42E Level 3 49 cm BD
Main Block Occupation 2
Permit # 01-45

Cat.No. 5149 retouched flake, well patterned bifacial retouch along one edge, may be broken preform
Material Type : brown silicified wood
Provenience : Main Block 264N 184E Level 8
Main Block Cultural Level 4
Permit # 01-45

Cat.No. 5150 retouched flake, moderately patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : Main Block 264.09N 185.53E Level 3 44 cm BD
Main Block Occupation 2
Permit # 01-45

Cat.No. 5151 utilized flake, irregular bifacial flake removal along one edge
Material Type : brown silicified wood
Provenience : Main Block 264.37N 185.17E Level 3 43 cm BD
Main Block Occupation 2
Permit # 01-45

Cat.No. 5152 retouched flake fragment, minimally patterned unifacial retouch along two edges
Material Type : Swan River chert
Provenience : Main Block 264N 185E Level 7

Permit # 01-45

Cat.No. 5153 retouched core fragment, well patterned unifacial retouch along one lateral edge of exhausted bipolar core fragment

Material Type : Swan River chert

Provenience : Main Block 264N 186E Level 8

Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5154 retouched flake fragment, well patterned unifacial retouch along one edge, unifacial flake removal off opposite edge and opposite face

Material Type : mottled grey chert

Provenience : Main Block 264.72N 186.09E Level 8 85 cm BD

Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5155 retouched flake fragment, well patterned unifacial retouch along one edge, unifacial flake removal off opposite edge

Material Type : Swan River chert

Provenience : Main Block 264N 186E Level 8

Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5156 retouched flake, well patterned unifacial retouch along one edge and along two small sections of opposite edge on opposite face

Material Type : brown silicified peat

Provenience : Main Block 264N 191E Level 8

Permit # 01-45

Cat.No. 5157 retouched flake fragment, well patterned unifacial retouch along both edges

Material Type : Knife River flint

Provenience : Main Block 264N 188E Level 3

Main Block Occupation 2

Permit # 01-45

Cat.No. 5158 retouched flake fragment, poorly patterned bifacial retouch along both lateral edges, possibly fragment of crude drill
Material Type : mixed black chert
Provenience : Main Block 264.16N 191.33E Level 5 69 cm BD
Permit # 01-45

Cat.No. 5159 retouched flake fragment, well patterned unifacial retouch along both lateral edges
Material Type : Swan River chert
Provenience : Main Block 264.03N 190.38E Level 6 72 cm BD
Permit # 01-45

Cat.No. 5160 retouched flake, poorly patterned unifacial retouch along one edge
Material Type : Swan River chert
Provenience : Main Block 264.82N 191.60E Level 8 94 cm BD
Permit # 01-45

Cat.No. 5161 retouched flake, well patterned unifacial retouch along one edge, moderately patterned bifacial retouch along opposite edge
Material Type : Swan River chert
Provenience : Main Block 264N 191E Level 9
Main Block Cultural Level 4
Permit # 01-45

Cat.No. 5162 retouched flake, well patterned unifacial retouch along one edge, unifacial flake removal from use along section of opposite edge
Material Type : banded grey chert
Provenience : Main Block 264N 192E Level 7
Permit # 01-45

Cat.No. 5163 utilized flake fragment, irregular unifacial flake removal along one edge and off opposite face along second edge

Material Type : mixed yellow chalcedony
Provenience : Main Block 264N 192E Level 7
Permit # 01-45

Cat.No. 5164 retouched flake, well patterned unifacial retouch along one edge
Material Type : brown silicified peat
Provenience : Main Block 264.63N 194.87E Level 7 86 cm BD
Permit # 01-45

Cat.No. 5165 retouched flake fragment, well patterned unifacial retouch along one edge
Material Type : black chert
Provenience : Main Block 264N 194E Level 8
Permit # 01-45

Cat.No. 5166 retouched flake, moderately patterned unifacial retouch along one edge
Material Type : Gronlid siltstone
Provenience : Main Block 264N 195E Level 9
Permit # 01-45

Cat.No. 5167 retouched flake, well patterned unifacial retouch along portion of distal end on ventral surface, unifacial flake removal along platform edge of core rejuvenation flake, edge shows unifacial retouch that may relate to use as tool or may relate to platform preparation
Material Type : mixed brown chert
Provenience : Main Block 264N 195E Level 9
Permit # 01-45

Cat.No. 5168 retouched flake fragment, well patterned unifacial retouch along one edge and along adjacent edge but on opposite face
Material Type : Knife River flint
Provenience : Main Block 264N 196E Level 3
Main Block Occupation 2
Permit # 01-45

Cat.No. 5169 retouched flake, moderately patterned unifacial retouch along one lateral edge of secondary flake

Material Type : yellow quartzite

Provenience : Main Block 264.65N 196.07E Level 6 77 cm BD

Permit # 01-45

Cat.No. 5170 retouched flake, poorly patterned unifacial retouch along sections of both lateral edges, unifacial battering along distal end of flake possibly due to bipolar flaking not use

Material Type : grey quartzite

Provenience : Main Block 264.38N 196.69E Level 8 93 cm BD

Permit # 01-45

Cat.No. 5171 retouched flake fragment, well patterned unifacial retouch along one edge

Material Type : black chert

Provenience : Main Block 264N 197E Level 9

Permit # 01-45

Cat.No. 5172 retouched flake fragment, moderately patterned unifacial retouch along both edges

Material Type : brown silicified peat

Provenience : Main Block 264N 197E Level 10
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5173 retouched flake fragment, moderately patterned unifacial retouch along one edge and section of distal end of primary decortication flake

Material Type : mixed grey quartzite

Provenience : Main Block 265.28N 183.49E Level 4 52 cm BD

Permit # 01-45

Cat.No. 5174 retouched flake fragment, well patterned unifacial retouch along one edge

Material Type : black chert

Provenience : Main Block 265N 183E Level 8
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5175 retouched cobble spall, poorly patterned unifacial retouch along one edge and section of distal end, possibly utilization of other sections of both lateral edges near proximal end

Material Type : mixed grey quartzose

Provenience : Main Block 265.42N 183.79E Level 8 96 cm BD
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5176 utilized flake fragment, unifacial flake removal off both lateral edges

Material Type : grey quartzite

Provenience : Main Block 265N 184E Level 2
Main Block Occupation 1

Permit # 01-45

Cat.No. 5177 retouched flake, moderately patterned unifacial retouch along section of both lateral edges and rounded distal end, may be early stage preform though lateral edges show use

Material Type : black chert

Provenience : Main Block 265N 185E Level 3
Main Block Occupation 2

Permit # 01-45

Cat.No. 5178 retouched flake fragment, poorly patterned unifacial retouch along one edge

Material Type : feldspathic siltstone

Provenience : Main Block 265N 185E Level 1
Main Block Occupation 1

Permit # 01-45

Cat.No. 5179 retouched flake fragment, well patterned unifacial retouch along one edge

Material Type : Swan River chert

Provenience : Main Block 265N 186E Level 8
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5180 utilized flake, poorly patterned unifacial flake removal off section of one edge

Material Type : Swan River chert

Provenience : Main Block 265N 189E Level 9
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5181 retouched flake, poorly patterned unifacial retouch along alternating faces of one lateral edge of secondary flake

Material Type : mottled yellow quartzite

Provenience : Main Block 265.10N 188.56E Level 5 60 cm BD

Permit # 01-45

Cat.No. 5182 retouched flake, well patterned unifacial retouch on alternating faces along one lateral, moderately patterned bifacial retouch along distal section of opposite edge

Material Type : grey porcellanite

Provenience : Main Block 265N 188E Level 9
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5183 retouched flake, well patterned unifacial retouch along section of distal end, utilization / poorly patterned unifacial flake removal along both lateral edges and distal end

Material Type : brown chalcedony with inclusion

Provenience : Main Block 265N 189E Level 5

Permit # 01-45

Cat.No. 5184 retouched flake / multipurpose tool, well patterned unifacial retouch along distal end and one lateral edge, section of edge is concave and was possibly used as spokeshave, pointed edge possibly used as graver

Material Type : brown silicified wood

Provenience : Main Block 265N 190E Level 6

Permit # 01-45

Cat.No. 5185 retouched flake fragment, well patterned unifacial retouch along one edge

Material Type : heat treated Swan River chert

Provenience : Main Block 265N 190E Level 9
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5186 retouched flake fragment, well patterned unifacial retouch along both lateral edges

Material Type : black chert with limestone cortex

Provenience : Main Block 265N 191E Level 7

Permit # 01-45

Cat.No. 5187 retouched flake fragment, well patterned unifacial retouch along one edge, retouch comes to sharp point which was possibly used as graver

Material Type : Gronlid siltstone

Provenience : Main Block 265.40N 191.05E Level 8 92 cm BD

Permit # 01-45

Cat.No. 5188 retouched flake, poorly patterned bifacial retouch along distal end, poorly patterned unifacial retouch along pointed section of lateral edge, moderately patterned unifacial retouch along opposite edge

Material Type : Swan River chert

Provenience : Main Block 265.14N 192.26E Level 6 80 cm BD

Permit # 01-45

Cat.No. 5189 retouched flake fragment, moderately patterned unifacial retouch along both edges, possibly proximal end of scraper
Material Type : grey chalcedony with inclusions
Provenience : Main Block 265N 192E Level 7
Permit # 01-45

Cat.No. 5190 retouched flake fragment, moderately patterned unifacial retouch along two sections of one lateral edge and along section of opposite edge
Material Type : mixed yellow chert
Provenience : Main Block 265.18N 192.05E Level 8 93 cm BD
Permit # 01-45

Cat.No. 5191 retouched flake fragment, moderately patterned unifacial retouch along one edge
Material Type : red silicified wood
Provenience : Main Block 265N 193E Level 8
Permit # 01-45

Cat.No. 5192 retouched flake fragment, well patterned unifacial retouch along one edge
Material Type : Knife River flint
Provenience : Main Block 265N 194E Level 6
Permit # 01-45

Cat.No. 5193 retouched flake, moderately patterned bifacial retouch along two edges
Material Type : brown silicified wood
Provenience : Main Block 265N 194E Level 6
Permit # 01-45

Cat.No. 5194 retouched flake, moderately patterned unifacial retouch along one edge, poorly patterned unifacial retouch along two sections of distal end
Material Type : Swan River chert
Provenience : Main Block 265.48N 197.42E Level 9 104 cm BD
Permit # 01-45

Cat.No. 5195 retouched flake fragment, well patterned unifacial retouch along both edges

Material Type : heat treated Swan River chert

Provenience : Main Block 265N 198E Level 9

Permit # 01-45

Cat.No. 5196 retouched cobble spall, well patterned unifacial retouch along convex distal end, possibly scraper

Material Type : mottled yellow quartzite

Provenience : Main Block 265.53N 199.26E Level 9 105 cm BD

Permit # 01-45

Cat.No. 5197 retouched flake fragment, moderately patterned unifacial retouch along one edge

Material Type : black chert

Provenience : Main Block 265N 199E Level 9

Permit # 01-45

Cat.No. 5198 retouched flake fragment, poorly unifacial retouch along section of one lateral edge

Material Type : heat damaged mixed grey chert

Provenience : Main Block 266N 183E Level 9
Main Block Cultural Level 4

Permit # 01-45

Cat.No. 5199 retouched flake fragment, well patterned retouch along one edge and section of opposite edge of bifacial thinning flake

Material Type : brown silicified peat

Provenience : Main Block 267.11N 183.89E Level 4 57 cm BD

Permit # 01-45

Cat.No. 5200 retouched flake, moderately patterned unifacial retouch along one edge and along section of opposite edge

Material Type : Swan River chert

Provenience : Main Block 268.122N 183.34E Level 7 83 cm BD
Permit # 01-45

Cat.No. 5201 retouched flake, well patterned unifacial retouch along two sections of left lateral edge and alternating well patterned unifacial retouch along right edge
Material Type : Montana chert
Provenience : Main Block 270N 182E Level 2
Main Block Occupation 1
Permit # 01-45

Cat.No. 5202 utilized flake, poorly patterned unifacial flake removal off section of one edge
Material Type : brown silicified peat
Provenience : Block 2 242N 229E Level 8
Block 2 Component 6
Permit # 01-45

Cat.No. 5203 utilized flake, poorly patterned unifacial flake removal off one edge
Material Type : mixed grey quartzite
Provenience : Block 2 242.02N 232.59E Level 4 47 cm BD
Block 2 Component 3
Permit # 01-45

Cat.No. 5204 utilized flake, poorly patterned unifacial flake removal off one edge
Material Type : banded white quartz
Provenience : Block 2 242.53N 233.82E Level 4 44 cm BD
Block 2 Component 3
Permit # 01-45

Cat.No. 5205 retouched flake fragment, well patterned unifacial retouch along one edge
Material Type : white chalcedony
Provenience : Block 2 243N 230 Level 1
Block 2 Component 1

Permit # 01-45

Cat.No. 5206 retouched flake fragment, moderately patterned unifacial retouch along one edge

Material Type : brown silicified wood

Provenience : Block 2 243N 230E Level 5

Block 2 Component 4

Permit # 01-45

Expediency Tool Measurements, Site EgNo 23

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
101	9.2	6.9	4.2	213.0
111	2.4	1.7	0.7	3.3
114	2.7	2.4	0.7	4.5
115	2.1	0.7	0.4	0.5
118	2.2	2.0	0.6	2.1
124	6.1	3.3	1.2	20.8
181	1.9	2.9	0.7	3.8
192	3.8	2.3	0.6	4.6
195	2.1	1.1	0.5	1.3
209	2.1	1.9	0.5	1.7
221	2.7	2.1	0.9	4.9
240	2.7	3.4	0.9	8.1
274	5.5	2.8	1.2	20.4
301	5.2	3.0	1.3	31.4
304	3.5	3.3	0.6	7.8
306	2.6	1.5	0.6	2.4
310	1.6	1.2	0.7	1.5
327	1.9	2.4	0.8	3.5
329	1.4	2.2	0.8	2.6
332	2.6	1.7	0.6	2.6
340	3.8	3.5	0.7	10.5
342	1.5	1.5	0.2	0.3
393	1.4	1.3	0.3	0.7
655	7.5	7.8	2.1	165.1
656	7.5	8.0	2.0	123.6
660	3.2	2.2	0.8	5.7
673	6.8	4.5	2.5	122.4
692	2.5	2.9	1.0	3.9
1084	3.1	2.6	1.5	9.3
1094	1.6	2.2	0.3	1.0
1103	0.9	1.1	0.3	0.1
1172	2.5	1.5	0.4	1.4
1189	2.4	1.2	0.4	0.6
1289	1.4	1.6	0.2	0.3
1374	1.8	0.9	0.5	0.4
1410	1.9	1.5	0.6	1.6
1429	1.9	1.1	0.4	0.7
1443	5.6	2.4	1.3	15.2
1475	1.8	2.3	0.5	2.0
1477	2.1	1.7	0.5	1.6
1478	3.1	1.8	0.8	4.1
1484	1.6	1.4	0.7	1.1

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
1488	6.5	3.5	2.6	46.9
1495	3.1	3.3	1.1	10.1
1498	2.0	1.6	0.7	2.7
1503	3.1	2.5	1.1	6.6
1504	2.8	2.3	1.0	4.3
1505	1.6	2.2	0.6	2.2
5143	2.6	1.0	0.3	0.8
5144	1.5	1.4	0.3	0.8
5145	1.9	1.5	0.8	1.8
5146	1.1	1.8	0.4	0.7
5147	1.7	2.0	0.6	2.1
5148	2.6	1.7	0.8	4.0
5149	3.0	2.0	0.6	3.1
5150	2.2	2.1	0.4	1.7
5151	2.3	1.3	0.6	1.4
5152	2.6	1.6	0.9	3.8
5153	2.1	1.5	0.7	2.8
5154	1.5	1.2	0.4	0.5
5155	1.1	2.0	0.3	0.7
5156	2.8	1.4	0.4	1.3
5157	1.0	1.1	0.2	0.1
5158	1.5	1.0	0.4	0.7
5159	1.9	1.7	0.5	2.1
5160	2.5	1.9	0.5	2.0
5161	2.2	1.6	0.4	1.7
5162	2.5	2.1	0.5	1.9
5163	1.9	1.9	0.5	1.7
5164	2.9	2.6	0.7	6.4
5165	0.9	1.0	0.2	0.2
5166	2.3	1.6	0.3	1.3
5167	2.4	1.7	1.1	4.0
5168	1.2	1.4	0.3	0.6
5169	4.5	4.2	1.1	27.7
5170	3.7	2.2	0.8	6.9
5171	1.6	0.9	0.2	0.2
5172	1.1	1.0	0.2	0.2
5173	4.4	4.5	0.8	19.6
5174	1.4	1.1	0.2	0.4
5175	8.1	11.0	3.1	315.0
5176	1.8	2.1	0.4	1.4
5177	7.3	4.8	1.2	53.8
5178	1.9	2.8	0.4	2.2
5179	0.9	1.3	0.2	0.2

Cat.No.	length (cm)	width (cm)	thickness (cm)	weight (gm)
5180	2.7	2.2	0.5	2.5
5181	7.0	6.3	1.3	60.7
5182	2.7	1.4	0.3	1.3
5183	1.9	1.7	0.4	0.9
5184	2.6	1.8	0.5	2.4
5185	0.8	1.2	0.4	0.3
5186	1.4	1.2	0.3	0.5
5187	1.9	2.7	0.4	2.0
5188	2.9	1.8	0.8	3.7
5189	1.1	1.3	0.3	0.3
5190	3.9	2.5	0.7	6.1
5191	1.0	1.5	0.2	0.2
5192	1.8	1.7	0.2	0.4
5193	1.5	1.2	0.3	0.6
5194	3.3	3.1	0.6	6.3
5195	2.5	2.3	0.4	2.6
5196	7.1	5.0	1.6	78.3
5197	1.9	1.6	0.5	1.3
5198	3.2	3.1	0.8	8.3
5199	3.0	2.8	0.3	1.6
5200	3.9	2.8	1.2	11.9
5201	2.2	2.4	0.3	2.0
5202	2.1	1.9	0.5	1.5
5203	3.5	2.9	1.0	10.9
5204	3.3	1.9	0.6	3.6
5205	1.6	1.3	0.4	0.8
5206	1.3	1.4	0.4	0.5

APPENDIX C

RADIOCARBON DATES

Pelican Lake Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
British Columbia	DjPq 1		2405 +/- 135	Morlan 2005
Alberta	DjPm 36	Welsch	3670 +/- 130	Morlan 2005
Alberta	DjPm 44		3600 +/- 100	Morlan 2005
Alberta	EbOp 16	Cactus Flower	3560 +/- 75	Morlan 2005
Alberta	DjPm 44		3520 +/- 210	Morlan 2005
Alberta	EeOv 68	Saahkomaapina Block 4 Occup 4	3350 +/- 90	Head et al 2003, Morlan 2005
Alberta	EeOv 68	Saahkomaapina Block 4 Occup 5	3270 +/- 90	Head et al 2003, Morlan 2005
Alberta	DjPm 44		3160 +/- 100	Morlan 2005
Alberta	DkPj 1	Head-Smashed-In	3120 +/- 120	Morlan 2005
Alberta	DjPm 44		3110 +/- 90	Morlan 2005
Alberta	EhPv ?	Second Lake	3100 +/- 125	Morlan 2005
Alberta		Head-Smashed-In	3040 +/- 120	Foor 1982
Alberta	DjPm 36	Welsch	3000 +/- 170	Morlan 2005
Alberta	DjPm 116	Smyth Block F	2880 +/- 100	Landals 1991, Morlan 2005
Alberta	EbOp 16	Cactus Flower	2850 +/- 95	Morlan 2005
Alberta	EePk 272	Highwood burial	2825 +/- 95	Morlan 2005
Alberta	EhPv ?	Second Lake	2805 +/- 130	Morlan 2005
Alberta	DjPm 116	Smyth Block F	2770 +/- 100	Landals 1991, Morlan 2005
Alberta	DkPj 1	Head-Smashed-In	2770 +/- 90	Morlan 2005
Alberta	EhPv ?	Second Lake	2760 +/- 95	Morlan 2005
Alberta	DgPl 42		2760 +/- 80	Morlan 2005
Alberta	DjPo 46		2750 +/- 250	Foor 1982
Alberta	DjPm 116	Smyth Block K	2750 +/- 160	Landals 1991, Morlan 2005
Alberta		Head-Smashed-In	2690 +/- 90	Foor 1982
Alberta	EbOp 44		2680 +/- 130	Morlan 2005
Alberta	DjPm 116	Smyth Block C	2650 +/- 140	Landals 1991, Morlan 2005
Alberta	DgPl 42		2630 +/- 160	Foor 1982
Alberta	DjPm 116	Smyth	2630 +/- 120	Morlan 2005
Alberta	DjPo 46		2590 +/- 120	Morlan 2005
Alberta	DjPm 116	Smyth Block F	2590 +/- 90	Landals 1991, Morlan 2005
Alberta	DjPm 116	Smyth	2560 +/- 110	Morlan 2005
Alberta	DjPm 116	Smyth Block F	2540 +/- 100	Landals 1991, Morlan 2005
Alberta	EfPm 104	Bow Bottom	2530 +/- 120	Morlan 2005
Alberta	DjPp 3	Crowsnest Dance Hall	2530 +/- 100	Morlan 2005
Alberta	EhPv ?	Second Lake	2520 +/- 210	Morlan 2005
Alberta	EcPn 2	Cattle Baron	2520 +/- 110	Morlan 2005
Alberta	DjPm 116	Smyth	2510 +/- 90	Morlan 2005
Alberta	DjPp 15		2490 +/- 130	Morlan 2005
Alberta	DjPp 8		2460 +/- 130	Morlan 2005

Pelican Lake Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
Alberta	DjPm 116	Smyth Block L	2460 +/- 110	Landals 1991, Morlan 2005
Alberta	DjPp 3		2450 +/- 100	Foor 1982
Alberta	DjPl 13		2450 +/- 100	Morlan 2005
Alberta	EdPn 8	Boyd	2440 +/- 170	Morlan 2005
Alberta	DjPm 116	Smyth Block F	2375 +/- 90	Landals 1991
Alberta	DjPp 8		2340 +/- 310	Morlan 2005
Alberta	DjPm 116	Smyth	2300 +/- 110	Morlan 2005
Alberta	DjPp 5		2290 +/- 120	Morlan 2005
Alberta	EfPm 104	Bow Bottom	2290 +/- 120	Morlan 2005
Alberta	DjPm 116	Smyth	2290 +/- 100	Morlan 2005
Alberta	DjPo 46		2250 +/- 500	Foor 1982
Alberta	DjPf 83		2220 +/- 100	Morlan 2005
Alberta	DjPm 116	Smyth Block D	2220 +/- 110	Landals 1991
Alberta	DjPp 3	Crowsnest Dance Hall	2150 +/- 370	Morlan 2005
Alberta	DjPn 2		2070 +/- 370	Foor 1982
Alberta	DjPl 13		2060 +/- 90	Morlan 2005
Alberta	DjPn 62	S.S.Burmis	2020 +/- 110	Morlan 2005
Alberta	DkPj 1	Head-Smashed-In	2005 +/- 80	Morlan 2005
Alberta	DgPl 42		1980 +/- 90	Morlan 2005
Alberta		Head-Smashed-In	1975 +/- 80	Foor 1982
Alberta	DjPn 2		1940 +/- 110	Foor 1982
Alberta	EcPl 1	Old Women's	1920 +/- 75	Morlan 2005
Alberta	DgPl 42		1900 +/- 90	Foor 1982
Alberta		Old Women's	1840 +/- 70	Foor 1982
Alberta	DgPl 42		1550 +/- 120	Morlan 2005
Alberta	DkPj 1	Head-Smashed-In	1540 +/- 90	Morlan 2005
Alberta	DgPl 42		1470 +/- 120	Foor 1982
Alberta	DgPl 42		1425 +/- 160	Morlan 2005
Alberta	DkPj 1	Head-Smashed-In	1410 +/- 100	Morlan 2005
Alberta	DgPl 42		1300 +/- 160	Foor 1982
Alberta	FbPj 8		1280 +/- 130	Morlan 2005
Alberta	DjPo 46		1150 +/- 100	Morlan 2005
Alberta	DiPo 1		630 +/- 320	Morlan 2005
Alberta	EgPt 6		370 +/- 75	Foor 1982
Saskatchewan	DgMr 1	Long Creek	3710 +/- 70	Morlan 2005
Saskatchewan	DgMr 1	Long Creek 4B	3708 +/- 69	Bryant 2002
Saskatchewan	EdNh 35		3678 +/- 80	Cloutier 2004
Saskatchewan	EiNs 4	Sjovold	3675 +/- 150	Morlan 2005
Saskatchewan	EiNs 4	Sjovold XX	3595 +/- 150	Dyck + Morlan 1995
Saskatchewan	DiNj 8	Willowbunch	3400 +/- 90	Morlan 2005
Saskatchewan	EiNs 4	Sjovold	3355 +/- 160	Morlan 2005
Saskatchewan	DiMv 93	Crane	3330 +/- 95	Morlan 2005
Saskatchewan	EiNs 4	Sjovold XIX	3275 +/- 160	Dyck + Morlan 1995
Saskatchewan		Newo Asiniak level 4	3025 +/- 250	Kelly 1986
Saskatchewan	ElNo 3b	Cline	3005 +/- 110	Morlan 2005
Saskatchewan	DhOb 3	Bracken Cairn	2570 +/- 90	Morlan 2005
Saskatchewan	DhOb 3	Bracken Cairn	2465 +/- 85	Walker 1982

Pelican Lake Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
Saskatchewan	EkNv 26	Wallace Adair	2335 +/- 50	Morlan 2005
Saskatchewan	DgMr 1	Long Creek 4A	2243 +/- 100	Foor 1982, Bryant 2002
Saskatchewan		Walter Felt	2430 +/- 90	Foor 1982
Saskatchewan		Newo Asiniak level 3	2235 +/- 70	Kelly 1986
Saskatchewan	DgMr 1	Long Creek	2230 +/- 100	Morlan 2005
Saskatchewan	EgNo 23		1880 +/- 50	this thesis
Manitoba	EfLl ?	Eriksdale	3460 +/- 100	Morlan 2005
Manitoba	EaLf 1	Lockport	3300 +/- 295	Morlan 2005
Manitoba	EaLa 3	Bjorklund	3205 +/- 135	Morlan 2005
Manitoba	EaLa 3	Bjorklund	3185 +/- 105	Morlan 2005
Manitoba	DlLg 1	Paddon	3075 +/- 105	Morlan 2005
Manitoba	EaLa 3	Bjorklund	3025 +/- 160	Morlan 2005
Manitoba	EaLa 3	Bjorklund	2950 +/- 130	Morlan 2005
Manitoba	EaLa 3	Bjorklund	2920 +/- 130	Morlan 2005
Manitoba	EaLa 3	Bjorklund	2830 +/- 95	Morlan 2005
Manitoba	EaLa 3	Bjorklund	2785 +/- 120	Morlan 2005
Manitoba	EaLf 1	Lockport	2595 +/- 140	Morlan 2005
Manitoba	EaLf 1	Lockport	2395 +/- 85	Morlan 2005
Manitoba	DlLw 11	Kain	2145 +/- 105	Morlan 2005
Montana	24BW675	Pilgrim	3610 +/- 290	Morlan 2005
Montana	24FR52	Holmes Terrace	3320 +/- 120	Morlan 2005
Montana	24PH401	Keaster	3320 +/- 80	Morlan 2005
Montana	24BW559	Schmitt Mine	3240 +/- 95	Foor 1982, Morlan 2005
Montana	24BW559	Schmitt Mine	3180 +/- 70	Morlan 2005
Montana	24BW559	Schmitt Mine	3050 +/- 90	Foor 1982, Morlan 2005
Montana	24BW559	Schmitt Mine	3040 +/- 60	Morlan 2005
Montana	24BW559	Schmitt Mine	3030 +/- 90	Foor 1982, Morlan 2005
Montana	24BW559	Schmitt Mine	3005 +/- 90	Foor 1982, Morlan 2005
Montana	24BW559	Schmitt Mine	3000 +/- 90	Foor 1982, Morlan 2005
Montana	24BW559	Schmitt Mine	3000 +/- 50	Morlan 2005
Montana	24BW559	Schmitt Mine	2950 +/- 100	Morlan 2005
Montana	24BW559	Schmitt Mine	2940 +/- 70	Morlan 2005
Montana	24PH2886	King	2930 +/- 100	Morlan 2005
Montana	24SW651	Jarrett	2900 +/- 120	Morlan 2005
Montana	24BW559	Schmitt Mine	2890 +/- 90	Foor 1982, Morlan 2005
Montana	24BW559	Schmitt Mine	2840 +/- 60	Morlan 2005
Montana	24FR52	Holmes Terrace	2800 +/- 130	Morlan 2005
Montana	24BW559	Schmitt Mine	2730 +/- 80	Morlan 2005
Montana	24HL946	Laulo	2690 +/- 80	Morlan 2005
Montana	24BW559	Schmitt Mine	2680 +/- 120	Morlan 2005

Pelican Lake Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
Montana	24FR52	Holmes Terrace	2640 +/- 120	Morlan 2005
Montana	24HL946	Laulo	2640 +/- 90	Morlan 2005
Montana	24ML564	Stark	2640 +/- 90	Morlan 2005
Montana	24BW559	Schmitt Mine	2580 +/- 110	Morlan 2005
Montana	24FR52	Holmes Terrace	2550 +/- 170	Morlan 2005
Montana	24PR?	Upper Miles	2500 +/- 110	Morlan 2005
Montana		Upper Miles	2420 +/- 110	Foor 1982
Montana	24BW559	Schmitt Mine	2500 +/- 105	Morlan 2005
Montana	24PH2886	King	2480 +/- 70	Morlan 2005
Montana	24BW559	Schmitt Mine	2460 +/- 120	Morlan 2005
Montana	24BW559	Schmitt Mine	2460 +/- 85	Morlan 2005
Montana	24FR52	Holmes Terrace	2450 +/- 130	Morlan 2005
Montana	24PH2886	King	2440 +/- 100	Morlan 2005
Montana		Schmitt Mine	2420 +/- 105	Foor 1982
Montana	24BW559	Schmitt Mine	2400 +/- 120	Morlan 2005
Montana	24BW559	Schmitt Mine	2400 +/- 85	Morlan 2005
Montana	24PH2886	King	2400 +/- 70	Morlan 2005
Montana	24PA504	Myers-Hindman	2380 +/- 120	Morlan 2005
Montana		Schmitt Mine	2380 +/- 85	Foor 1982
Montana		Schmitt Mine	2320 +/- 85	Foor 1982
Montana	24PH8	Johnson Bison Kill	2310 +/- 80	Morlan 2005
Montana	24BW559	Schmitt Mine	2305 +/- 105	Morlan 2005
Montana	24PH401	Keaster	2270 +/- 95	Morlan 2005
Montana	24PE30	Ayers-Frazier	2260 +/- 150	Morlan 2005
Montana	24BW559	Schmitt Mine	2260 +/- 85	Morlan 2005
Montana	24BW559	Schmitt Mine	2260 +/- 90	Morlan 2005
Montana	24FR52	Holmes Terrace	2250 +/- 130	Morlan 2005
Montana	24PA195	Corwin Springs	2240 +/- 130	Morlan 2005
Montana		Schmitt Mine	2225 +/- 105	Foor 1982
Montana	24CB84	False Cougar Cave	2210 +/- 90	Morlan 2005
Montana		Schmitt Mine	2180 +/- 85	Foor 1982
Montana	24FR52	Holmes Terrace	2170 +/- 110	Morlan 2005
Montana	24DW250	Seline	2160 +/- 90	Morlan 2005
Montana	24FR52	Holmes Terrace	2060 +/- 120	Morlan 2005
Montana	24FR52	Holmes Terrace	2060 +/- 120	Morlan 2005
Montana	24PH401	Keaster	1945 +/- 250	Foor 1982, Morlan 2005
Montana	24DW250	Seline	1920 +/- 50	Morlan 2005
Montana	24CB85	Crystalsin Cave	1915 +/- 35	Morlan 2005
Montana	24BE84	Mammoth Meadow 1	1830 +/- 90	Morlan 2005
Montana	24FR52	Holmes Terrace	1800 +/- 100	Morlan 2005
Montana	24GV401	Stark-Lewis	1720 +/- 80	Morlan 2005
Montana		Stark-Lewis	1720 +/- 230	Foor 1982
Montana	24BW559	Schmitt Mine	1635 +/- 80	Foor 1982, Morlan 2005
Montana	24PA301	Eagle Creek	1230 +/- 160	Foor 1982, Morlan 2005
Montana	24JF110	Quinn Creek	900 +/- 50	Morlan 2005

Pelican Lake Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
Montana	24ST651	West Rosebud Lake	200 +/- 70	Morlan 2005
Wyoming	48FR34	Muddy Creek	3540 +/- 220	Foor 1982, Morlan 2005
Wyoming	48FR5	Poison Creek	3506 +/- 220	Foor 1982, Morlan 2005
Wyoming	48FR33	Muddy Creek	3350 +/- 250	Morlan 2005
Wyoming		McKean	3287 +/- 600	Foor 1982
Wyoming	48BH499	Medicine Lodge Creek	3110 +/- 170	Morlan 2005
Wyoming	48BH499	Medicine Lodge Creek	3020 +/- 140	Morlan 2005
Wyoming	48PA201	Mummy Cave	2820 +/- 135	Morlan 2005
Wyoming	48NO204	Lance Creek	2450 +/- 75	Morlan 2005
Wyoming	48BH730	Wortham Shelter	2180 +/- 110	Morlan 2005
Wyoming	48WE302	Fulton	2150 +/- 150	Morlan 2005
Wyoming	48BH460	Bandit	2130 +/- 60	Morlan 2005
Wyoming	48PA201	Mummy Cave	2050 +/- 150	Morlan 2005
Wyoming	48PL23		2020 +/- 260	Foor 1982
Wyoming	48PL23	Glendo	2020 +/- 100	Morlan 2005
Wyoming		Spring Creek Cave	1725 +/- 200	Foor 1982
Wyoming	48WA1	Spring Creek Cave	1725 +/- 100	Morlan 2005
Wyoming	48PL24	Glendo	1650 +/- 130	Morlan 2005
Wyoming	48HO301	Wedding of the Waters	1620 +/- 165	Foor 1982, Morlan 2005
Wyoming	48PL24		1525 +/- 130	Foor 1982
Wyoming	48BH206	Bottleneck Cave	1510 +/- 200	Foor 1982, Morlan 2005
Wyoming	48PL24		1325 +/- 150	Foor 1982
Colorado	5WL101	Happy Hollow	2680 +/- 90	Foor 1982, Morlan 2005
Colorado	5WL32	Uhl	2170 +/- 160	Foor 1982, Morlan 2005
Colorado	5WL101	Happy Hollow	2170 +/- 80	Foor 1982, Morlan 2005
Colorado	5WL32	Uhl	2095 +/- 105	Morlan 2005
Colorado	5WL32	Uhl	2010 +/- 65	Foor 1982, Morlan 2005
Colorado	5WL32	Uhl	1955 +/- 95	Foor 1982, Morlan 2005
North Dakota		Naze	2780 +/- 80	Gregg 1990
North Dakota	32MZ58	Mondrian Tree	2740 +/- 80	Morlan 2005
North Dakota		Naze	2472 +/- 45	Gregg 1990
North Dakota		Naze	2448 +/- 44	Gregg 1990
North Dakota		Naze	2440 +/- 70	Gregg 1990
North Dakota	32MZ58	Mondrian Tree	2400 +/- 85	Morlan 2005
North Dakota		Naze	2388 +/- 44	Gregg 1990
North Dakota	32MZ58	Mondrian Tree	2245 +/- 70	Morlan 2005
North Dakota	32MZ58	Mondrian Tree	2140 +/- 135	Morlan 2005
North Dakota	32MZ58	Mondrian Tree	2120 +/- 90	Morlan 2005

Pelican Lake Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
North Dakota		Naze	2035 +/- 70	Foor 1982
North Dakota	32MZ58	Mondrian Tree	830 +/- 80	Morlan 2005
South Dakota	39BF?	Sitting Crow	2475 +/- 150	Morlan 2005
South Dakota	39LM238	Good Soldier	2380 +/- 75	Morlan 2005
South Dakota		Good Soldier	2369 +/- 150	Foor 1982
South Dakota	39HN204	Lightning Spring	1920 +/- 120	Morlan 2005
Nebraska	25SX101	Cedar Canyon	3100 +/- 410	Morlan 2005
Nebraska	25SX101	Cedar Canyon	2675 +/- 280	Morlan 2005
Nebraska	25SF1	Signal Butte	2630 +/- 100	Foor 1982, Morlan 2005
Nebraska	25SX101	Cedar Canyon	2147 +/- 150	Morlan 2005
Nebraska	25SX107	Cedar Canyon	2049 +/- 180	Morlan 2005
		Montlock	2400 +/- 290	Foor 1982

Sandy Creek Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
Alberta	DlPb 2	Cranford	2550 +/- 90	Morlan 2005
Saskatchewan	EeMw 26	Lebret	3060 +/- 105	Morlan 2005
Saskatchewan	EeMw 26	Lebret	2495 +/- 440	Morlan 2005
Saskatchewan	EiNs 4	Sjovold	2435 +/- 105	Morlan 2005
Saskatchewan	EcNm 8	Walter Felt	2430 +/- 90	Morlan 2005
Saskatchewan	EcNl 1	Mortlach	2400 +/- 173	Morlan 2005
Saskatchewan	EiNs 4	Sjovold	2355 +/- 105	Dyck + Morlan 1995

Besant Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
British Columbia	HaRk 1	Farrell Creek	1630 +/- 100	Morlan 2005
British Columbia	HaRk 1	Farrell Creek	1530 +/- 70	Morlan 2005
Alberta	EaOq 43	Aldon Plant	3000 +/- 80	Morlan 2005
Alberta	EaOq 43	Aldon Plant	2730 +/- 90	Morlan 2005
Alberta	DjPm 116	Smyth, Block M	2630 +/- 120	Landals 1991
Alberta	EgPn 290	Happy Valley	2530 +/- 120	Morlan 2005
Alberta	EfPm 104	Bow Bottom, Ring 12	2530 +/- 120	Van Dyke 1982
Alberta	EgPn 290	Happy Valley	2520 +/- 120	Morlan 2005
Alberta	EgPn 290	Happy Valley	2430 +/- 80	Morlan 2005
Alberta	EaPk 109		2410 +/- 50	Morlan 2005
Alberta	DjPm 36	Welsch	2160 +/- 90	Morlan 2005
Alberta	DjPl 13		2150 +/- 100	Morlan 2005
Alberta	DjPm 198		2120 +/- 90	Morlan 2005
Alberta	EbOp 42		2110 +/- 100	Morlan 2005
Alberta	EbOp 44		2090 +/- 60	Morlan 2005
Alberta	DjPl 13		2060 +/- 120	Morlan 2005
Alberta	EhPp 1		2060 +/- 85	Morlan 2005
Alberta	DgOv 2		1990 +/- 150	Morlan 2005
Alberta	EaPk 109		1895 +/- 50	Morlan 2005
Alberta	DjPm 198		1880 +/- 100	Morlan 2005
Alberta	DjPm 44		1880 +/- 100	Morlan 2005
Alberta	DjPo 155		1870 +/- 110	Morlan 2005
Alberta	DkPj 35	Dersch Locality	1869 +/- 80	Morlan 2005
Alberta	DjPm 44		1820 +/- 90	Morlan 2005
Alberta	DjPn 132		1790 +/- 70	Morlan 2005
Alberta	EcPl 1	Old Women's	1730 +/- 65	Morlan 2005
Alberta	DjOu 5		1680 +/- 70	Morlan 2005
Alberta	EaPk 80		1630 +/- 75	Morlan 2005
Alberta	FdOt 9	Wells	1620 +/- 65	Morlan 2005
Alberta	DjPk 1	Kenney	1600 +/- 115	Morlan 2005
Alberta	DkPj 35	Dersch Locality	1550 +/- 90	Morlan 2005
Alberta	EhPv?	Echo Creek	1540 +/- 100	Morlan 2005
Alberta	DkPj 35	Dersch Locality	1540 +/- 90	Morlan 2005
Alberta	DkPj 1	Head-Smashed-In	1540 +/- 90	Morlan 2005
Alberta	DlPk 3	Trout Creek	1510 +/- 105	Morlan 2005
Alberta	EgPn 111		1480 +/- 70	Morlan 2005
Alberta	DjPk 1	Kenney	1460 +/- 110	Morlan 2005
Alberta	DjPo 40		1450 +/- 80	Morlan 2005
Alberta	DlPk 2	Morkin	1420 +/- 130	Morlan 2005
Alberta	DkPj 1	Head-Smashed-In	1410 +/- 100	Morlan 2005
Alberta	EgPn 111		1410 +/- 60	Morlan 2005
Alberta	EgPn 111		1370 +/- 60	Morlan 2005
Alberta	FbPf 1	Muhlbach	1350 +/- 150	Morlan 2005
Alberta	DlOp 2	Ross Glen	1330 +/- 160	Morlan 2005
Alberta	EhPv?	Echo Creek	1325 +/- 125	Morlan 2005
Alberta	EiPp 16	Hunter Valley	1260 +/- 50	Morlan 2005

Besant Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
Alberta	FiPp 2	Cormie Ranch	1175 +/- 130	Morlan 2005
Alberta	DjPo 40		1070 +/- 75	Morlan 2005
Alberta	DjPk 1	Kenney	700 +/- 60	Morlan 2005
Alberta	FbPf 1	Muhlbach	680 +/- 150	Gruhn 1971
Alberta	EhPo 78	Western Heritage Centre	510 +/- 80	Morlan 2005
Saskatchewan	FbNp 16	Newo Asiniak	3105 +/- 250	Morlan 2005
Saskatchewan	EiNs 4	Sjovold, Layer XI	2900 +/- 70	Dyck + Morlan 1995, Morlan 2005
Saskatchewan	DhMt 67	Tree	2790 +/- 75	Morlan 2005
Saskatchewan	EiNs 4	Sjovold	2585 +/- 90	Morlan 2005
Saskatchewan	EiNs 4	Sjovold	2580 +/- 85	Morlan 2005
Saskatchewan	EiNs 4	Sjovold, Layer X	2505 +/- 90	Dyck + Morlan 1995
Saskatchewan	EiNs 4	Sjovold, Layer XIV	2500 +/- 85	Dyck + Morlan 1995
Saskatchewan	FaNp 7	Rocky Island	2475 +/- 120	Morlan 2005
Saskatchewan	EiNs 4	Sjovold, Layer XII	2355 +/- 105	Dyck + Morlan 1995
Saskatchewan	EiNs 4	Sjovold, Layer X	2340 +/- 120	Dyck + Morlan 1995, Morlan 2005
Saskatchewan	FbNp 16	Newo Asiniak	2315 +/- 75	Morlan 2005
Saskatchewan	EiNs 4	Sjovold, Layer X	2190 +/- 140	Dyck + Morlan 1995, Morlan 2005
Saskatchewan	EiNs 4	Sjovold	2170 +/- 165	Morlan 2005
Saskatchewan	EiNs 4	Sjovold, Layer X	2090 +/- 165	Dyck + Morlan 1995
Saskatchewan	EgNn 1	Melhagen	2040 +/- 90	Morlan 2005
Saskatchewan	EgNn 1	Melhagen	1990 +/- 75	Morlan 2005
Saskatchewan	EcNj 7	Garratt	1990 +/- 75	Morlan 2005
Saskatchewan	EgNn 1	Melhagen	1985 +/- 110	Morlan 2005
Saskatchewan	EgNn 1	Melhagen	1960 +/- 90	Ramsay 1991
Saskatchewan	EgNn 1	Melhagen	1910 +/- 70	Ramsay 1991
Saskatchewan	EgNn 1	Melhagen	1905 +/- 110	Ramsay 1991
Saskatchewan	EgNn 1	Melhagen	1790 +/- 55	Morlan 2005
Saskatchewan	EiOj 1	Elma Thompson	1755 +/- 145	Morlan 2005
Saskatchewan	EdOh 23		1755 +/- 115	Morlan 2005
Saskatchewan	EgNn 1	Melhagen	1710 +/- 45	Ramsay 1991
Saskatchewan	DiMv 93	Crane	1680 +/- 75	Morlan 2005
Saskatchewan	EiOj 1	Elma Thompson	1675 +/- 145	Finnigan + Johnson 1984
Saskatchewan	EcNl 1	Mortlach	1660 +/- 159	Morlan 2005
Saskatchewan	EgNn 1	Melhagen	1655 +/- 115	Morlan 2005
Saskatchewan	FaNr 2	Grandora	1640 +/- 65	Morlan 2005
Saskatchewan	ElNk 1	Coffin	1635 +/- 85	Morlan 2005
Saskatchewan	FbNp 1	Tipperary Creek	1615 +/- 80	Morlan 2005
Saskatchewan	EcNm 8	Walter Felt	1610 +/- 70	Morlan 2005
Saskatchewan	EgNn 1	Melhagen	1575 +/- 115	Ramsay 1991
Saskatchewan	ElNp 8	Fitzgerald	1570 +/- 90	Morlan 2005
Saskatchewan	EcNm 8	Walter Felt	1535 +/- 90	Morlan 2005
Saskatchewan	EcNm 8	Walter Felt	1535 +/- 80	Morlan 2005
Saskatchewan	ElNp 8	Fitzgerald	1490 +/- 90	Hjermstad 1996
Saskatchewan	ElNp 8	Fitzgerald	1420 +/- 65	Morlan 2005

Besant Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
Saskatchewan	EdNh 35		1378 +/- 45	Cloutier 2004
Saskatchewan	ElNp 8	Fitzgerald	1350 +/- 140	Morlan 2005
Saskatchewan	ElNp 8	Fitzgerald	1340 +/- 60	Hjermstad 1996
Saskatchewan	EdNh 35		1283 +/- 60	Cloutier 2004
Saskatchewan	ElNp 8	Fitzgerald	1270 +/- 140	Hjermstad 1996
Saskatchewan	ElNp 8	Fitzgerald	1240 +/- 170	Morlan 2005
Saskatchewan	ElNp 8	Fitzgerald	1160 +/- 170	Hjermstad 1996
Saskatchewan	EgNn 1	Melhagen	890 +/- 205	Morlan 2005
Saskatchewan	EgNn 1	Melhagen	810 +/- 205	Ramsay 1991
Manitoba	DlLw 11	Kain	1700 +/- 100	Morlan 2005
Manitoba	DjMd 4	Owti	1520 +/- 65	Morlan 2005
Manitoba	DhLw 1	Richards Village	1510 +/- 150	Morlan 2005
Manitoba	DiMd 7	Mullett	1390 +/- 100	Morlan 2005
Manitoba	DhLw 1	Richards Village	1375 +/- 120	Morlan 2005
Manitoba	DhLw 1	Richards Village	1320 +/- 130	Morlan 2005
Manitoba	DiMd 7	Mullett	1310 +/- 100	Morlan 2005
Montana	24DW140	South Bank	2225 +/- 125	Morlan 2005
Montana	24PH601		2100 +/- 220	Morlan 2005
Montana	24HL101	Wahkpa Chu'gn	2000 +/- 70	Morlan 2005
Montana	24BL1152	Herdegen's Birdtail Butte	1960 +/- 80	Morlan 2005
Montana	24DW85	Mini-Moon	1930 +/- 80	Morlan 2005
Montana	24DW85	Mini-Moon	1910 +/- 80	Morlan 2005
Montana	24HL101	Wahkpa Chu'gn	1840 +/- 110	Morlan 2005
Montana	24HL101	Wahkpa Chu'gn	1805 +/- 120	Morlan 2005
Montana	24SW651	Jarrett	1730 +/- 110	Morlan 2005
Montana	24BL1152	Herdegen's Birdtail Butte	1690 +/- 80	Morlan 2005
Montana	24GA660	Antonsen	1605 +/- 90	Morlan 2005
Montana	24DW140	South Bank	1600 +/- 85	Morlan 2005
Montana	24RB1011	Horse Shelter	1645 +/- 120	Morlan 2005
Montana	24DW1001	Whiskey Hill	1555 +/- 60	Morlan 2005
Montana	24DW85	Mini-Moon	1520 +/- 70	Morlan 2005
Montana	24LT22	Leavitt-Rinehart	1260 +/- 950	Morlan 2005
Montana	24GA660	Antonsen	1180 +/- 110	Morlan 2005
Montana	24RB1020	Ellison's Rock	1150 +/- 50	Morlan 2005
Montana	24RB1020	Ellison's Rock	1030 +/- 80	Morlan 2005
Montana	24LT22	Leavitt-Rinehart	1025 +/- 120	Morlan 2005
Montana	24RB1020	Ellison's Rock	900 +/- 50	Morlan 2005
Montana	24CA73	Stelling	750 +/- 200	Morlan 2005
Wyoming	48CA104	Mooney	2120 +/- 90	Morlan 2005
Wyoming	48NA83	Cedar Gap	1820 +/- 70	Morlan 2005
Wyoming	48CA302	Ruby	1800 +/- 140	Morlan 2005
Wyoming	48NA1000	Butler-Rissler	1800 +/- 100	Morlan 2005
Wyoming	48CR324	Upper Muddy Creek	1720 +/- 110	Morlan 2005
Wyoming	48CA302	Ruby	1670 +/- 135	Frison 1971, Morlan 2005
Wyoming	48NA1000	Butler-Rissler	1660 +/- 90	Morlan 2005
North Dakota	32SI1	Boundary Mound	2200 +/- 125	Morlan 2005

Besant Phase Radiocarbon Dates

Province / State	Site	Site Name	Radiocarbon Date	Source
North Dakota	32ML111	Anderson Tipi Ring	2080 +/- 70	Morlan 2005
North Dakota	32SN246	Naze	2035 +/- 70	Morlan 2005
North Dakota	32SN246	Naze	2010 +/- 30	Morlan 2005
North Dakota	32SN246	Naze	1940 +/- 30	Morlan 2005
North Dakota	32BA1	Baldhill	1860 +/- 150	Morlan 2005
North Dakota	32OL270		1780 +/- 60	Morlan 2005
North Dakota	32OL270		1740 +/- 110	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	1720 +/- 90	Morlan 2005
North Dakota	32OL270		1660 +/- 110	Morlan 2005
North Dakota	32SI200	Alkire Mound	1650 +/- 200	Morlan 2005
North Dakota	32SI6	Porcupine Creek	1625 +/- 80	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	1620 +/- 70	Morlan 2005
North Dakota	32ME13	High Butte	1600 +/- 145	Morlan 2005
North Dakota	32SI1	Boundary Mound	1540 +/- 160	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	1500 +/- 50	Morlan 2005
North Dakota	32OL270		1470 +/- 80	Morlan 2005
North Dakota	32OL270		1450 +/- 100	Morlan 2005
North Dakota	32OL270		1450 +/- 70	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	1450 +/- 60	Morlan 2005
North Dakota	32OL270		1430 +/- 70	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	1400 +/- 90	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	1350 +/- 60	Morlan 2005
North Dakota	32SI1	Boundary Mound	1340 +/- 150	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	1330 +/- 80	Morlan 2005
North Dakota	32OL270		1310 +/- 100	Morlan 2005
North Dakota	32OL270		1210 +/- 100	Morlan 2005
North Dakota	32OL270		1070 +/- 150	Morlan 2005
North Dakota	32OL270		1070 +/- 100	Morlan 2005
North Dakota	32OL270		1070 +/- 100	Morlan 2005
North Dakota	32OL270		900 +/- 80	Morlan 2005
North Dakota	32OL270		860 +/- 80	Morlan 2005
North Dakota	32ML111	Anderson Tipi Ring	850 +/- 70	Morlan 2005
North Dakota	32OL270		modern	Morlan 2005
South Dakota	39DW252	Arpan Mound	1850 +/- 90	Morlan 2005
South Dakota	39DW233	Swift Bird	1825 +/- 120	Morlan 2005
South Dakota	39DW240	Grover Hand	1720 +/- 75	Morlan 2005
South Dakota	39DW240	Grover Hand	1640 +/- 80	Morlan 2005
South Dakota	39DW233	Swift Bird	1600 +/- 100	Morlan 2005
South Dakota	39RO26	Sisseton Mound	830 +/- 85	Morlan 2005
South Dakota	39DW240	Grover Hand	650 +/- 200	Morlan 2005